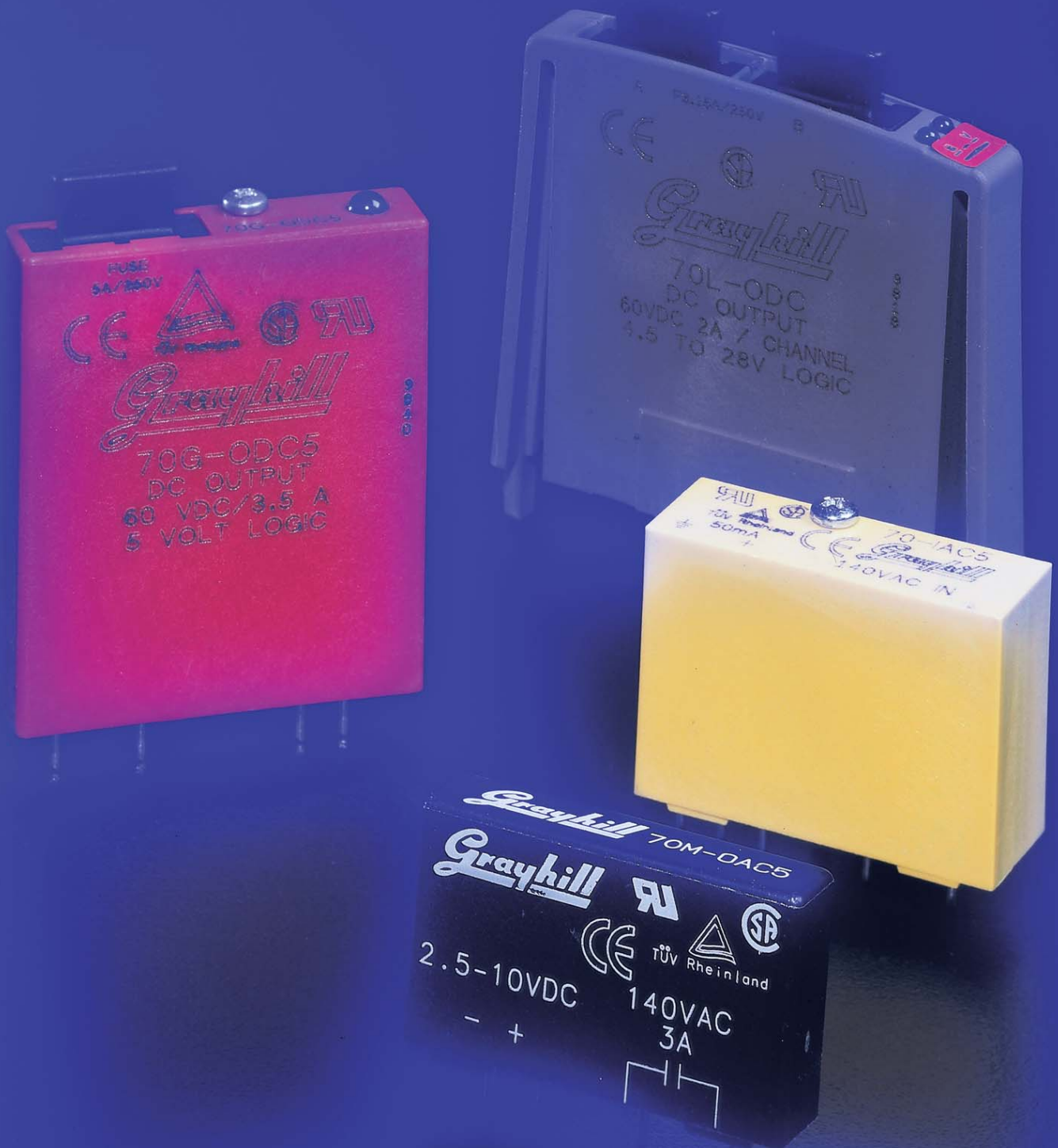
I/O MODULES


FUSE
5A/250V
Grayhill
70G-ODC5
DC OUTPUT
60 VDC/3.5 A
5 VOLT LOGIC
Grayhill
70L-ODC
DC OUTPUT
60VDC 2A / CHANNEL
4.5 TO 28V LOGIC
70-IAC5
140VAC IN
Grayhill 70M-DAC5
Grayhill
TÜV Rheinland
2.5-10VDC
140VAC
3A
- +

I/O MODULES

- Mix Digital and Analog Modules on the Same Rack
- Choice of Standard, Miniature, Fusible G5 Package or Dual Point OpenLine® Styles
- Companion Racks for All Packages Provide Mounting and Wiring Termination Solutions
- Combine with Controller Boards in a Distributed I/O System or Stand Alone Configuration

WARRANTY

All products in this section are covered by a limited two-year warranty from the date of purchase. All digital I/O and OpenLine® analog I/O are covered with a lifetime warranty.

Page

I/O MODULES

Our line of pluggable input and output modules provide a low cost, versatile method for interconnecting real world analog and digital signals to data acquisition, monitoring, or control systems. All modules provide an optically isolated barrier between sensitive microprocessor or digital logic circuits and field power devices.

In the G5 and OpenLine® packages, analog **and** digital I/O modules are available with the same pin-out. This gives the flexibility of mixing and matching module types on the same mounting rack or base; making them perfect in applications which require interface to a variety of different sensors and loads.

The case color of the single point modules identify their function. The industry standard for single point I/O module case colors is:

Digital AC Output Module = Black Case
Digital DC Output Module = Red Case
Digital AC Input Module = Yellow Case
Digital DC Input Module = White Case

DIGITAL OUTPUT MODULES

Digital output modules are used to switch AC and DC loads such as solenoids, motors, or lamps from logic signal levels. Their inputs are directly compatible with TTL or CMOS interface circuitry.

AC output modules have zero voltage turn-on of the load to greatly reduce generated EMI and RFI. They are highly immune to electrical transients, and have built-in RC snubber networks for increased capability with inductive loads.

DC output modules can operate DC loads over a wide voltage range and have built-in voltage spike protection.

DIGITAL INPUT MODULES

Digital input modules are used to monitor the status of a load or a sensor (such as a limit switch, pressure switch, or temperature switch). The output of these modules is a logic level signal which corresponds to the status of the device being monitored. A high level output signal indicates the load is off (the switch is open). A low level output signal indicates the load is on (the switch is closed). Input modules are designed to give fast, clean switching by providing filtering and hysteresis.

Input and output modules are compatible in that the output of one can drive the input of the other.

UL, CSA AND CE APPROVALS

As one of the world's leading manufacturers of I/O modules, we strive to assure that our products comply with all of the applicable international standards. In doing so, we believe your products will also be readily accepted and easily certified. All modules shown in this section have been tested to UL Standard 508 and are documented in UL file number E58632. Similarly, they have been tested to CSA Standard 22.2 No. 14-95M and are documented in CSA file LR38763. Additionally, OpenLine® modules were tested and passed CSA 22.2 No. 213-M1987 Class I, Div. 2 Groups A, B, C and D. Parts bearing the CE logo indicate conformance with EN50082-2 and EN50081-2 (89/336/EEC EMC directive) as well as EN60950 (61010-1) for the low voltage directive. Contact Grayhill for copies of our Declaration of Conformity or visit out website. Parts bearing the TÜV logo indicate that they were the agency which performed the EN60950 evaluation.

CONSTRUCTION AND LIFETIME WARRANTY

All of our I/O modules are hard potted with thermally conductive epoxy to withstand harsh industrial environments. The modules provide optical isolation, immunity to mechanical shock and vibration, and operate over a wide temperature range. The module cases are a solvent resistant thermoplastic which meets UL94-V-0 rating. The terminal pins are a tin-plated copper wire. Component selection and surface mount construction allow low operating junction temperatures for long life. Superior design, rigorous testing, and field data give us the confidence to back our I/O modules with the industry's first lifetime warranty.

I/O MODULE WIRING

Analog and digital modules can be placed at any I/O location, however, to minimize the possibility of crosstalk and noise pickup it is a good practice to group similar module types together. 14 or 16 gauge wire is typically used to wire the field devices to the I/O rack terminal block.

PART NUMBER EXPLANATION: Digital I/O Modules

70M-ODC5A

Module Type
70 = Digital Module, Standard Package
70G = Digital Module, G5 Package
70L = Digital Module, OpenLine® Package
70M = Digital Module, Mini Package

Function
OAC = Digital Output AC
ODC = Digital Output DC
IAC = Digital Input AC
IDC = Digital Input DC

Suffix

AC Inputs:	Blank = 120 Vac	A = 220 Vac	
DC Inputs:	Blank = 3-32 Vdc	B = Fast Switching	NP = 15-32 Vac/10-32 Vdc
	G = 35-60 Vac/Vdc	D = 2.5–28 Vdc	K = 2.5-16 Vdc
	L = Inductive loads	S = Dry Contacts	
AC Outputs:	Blank = 120 Vac	A = 220 Vac	A-11 = Non-Zero Cross
	MA = 120 Vac, Manual Override	A-5 = Normally Closed	
	AMA = 240 Vac, Manual Override		
DC Outputs:	Blank = 3-60 Vdc Fast	A = 4-200 Vdc R = Dry Contact	
	MA = 3-60 Vdc, Manual Override	B = 3-60 Vdc, Low Leakage	

Logic Supply Voltage or Range
Digital Modules: Blank = 4.5-28 Vdc (OpenLine®)
5 Vdc, 15 Vdc, 24 Vdc = Logic Supply Voltage (Standard, Mini, G5)
Analog Modules: 4.75-5.25 Vdc

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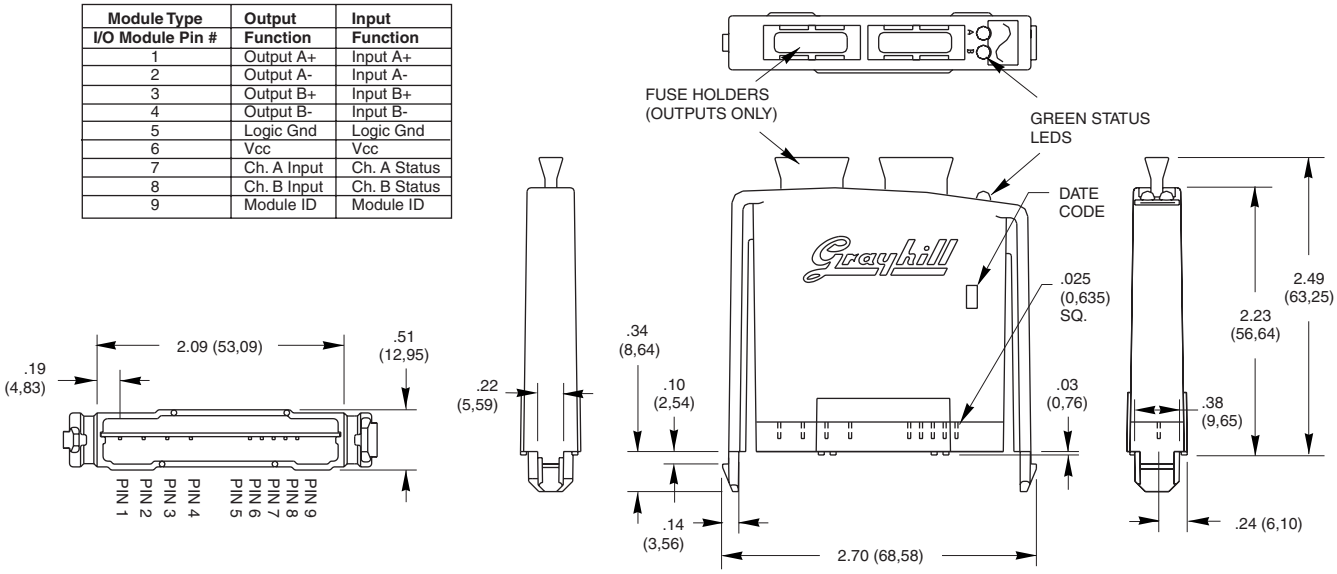
DIMENSIONS: OpenLine® Digital Modules

Dimensions shown in inches (and millimeters).
Tolerances are ± .010 (0,25) unless indicated otherwise.

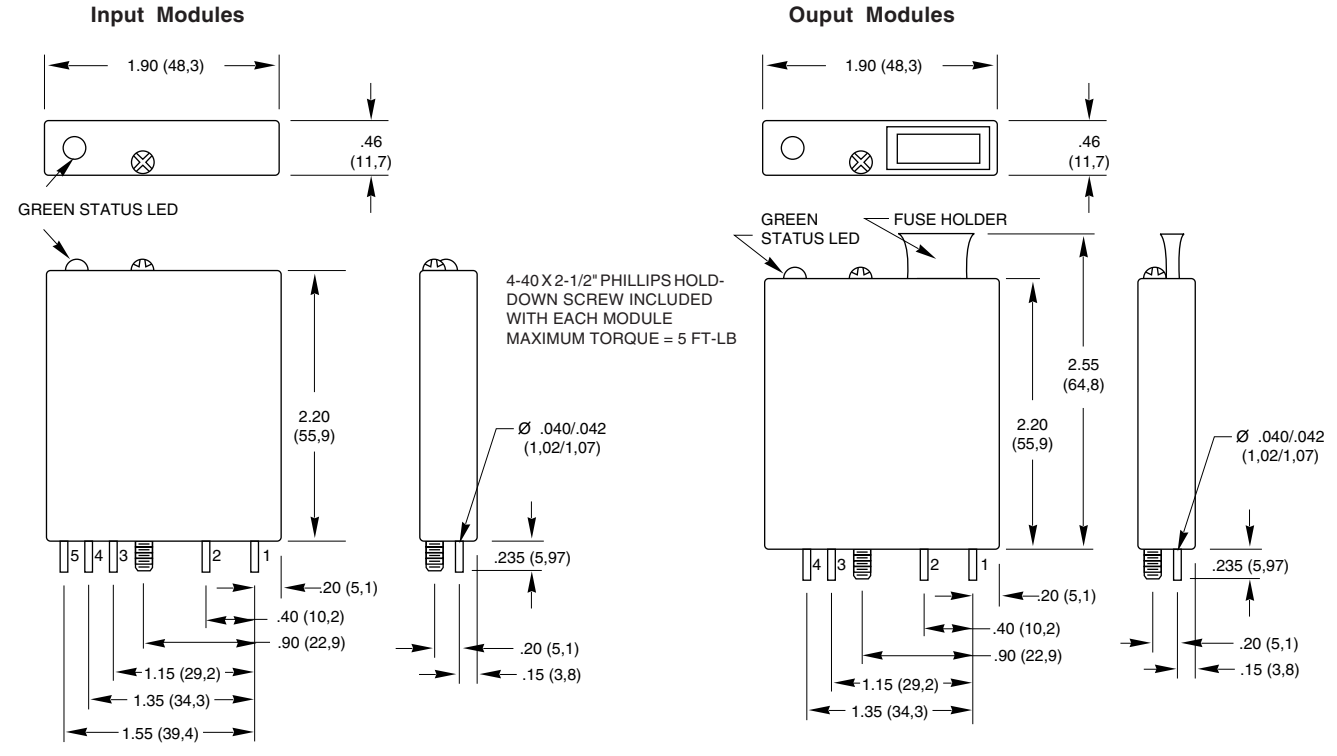
Module Type	Output	Input
I/O Module Pin #	Function	Function
1	Output A+	Input A+
2	Output A-	Input A-
3	Output B+	Input B+
4	Output B-	Input B-
5	Logic Gnd	Logic Gnd
6	Vcc	Vcc
7	Ch. A Input	Ch. A Status
8	Ch. B Input	Ch. B Status
9	Module ID	Module ID



Note: For PC board layout information, request Bulletin #745

DIMENSIONS: G5 Digital Modules

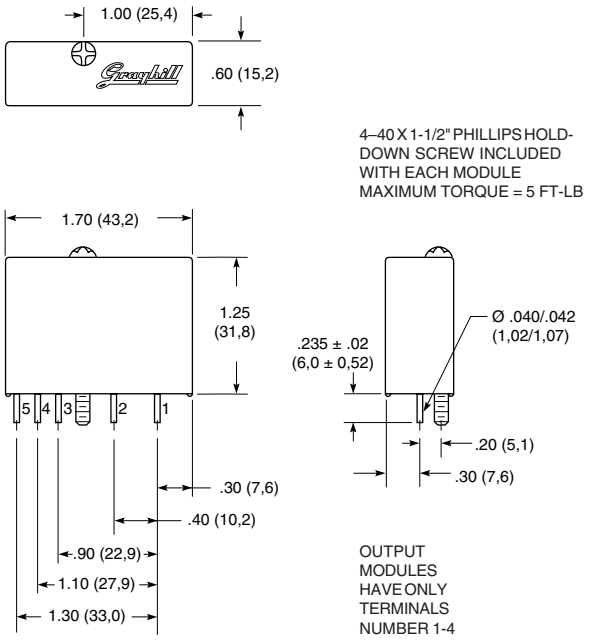
Dimensions shown in inches (and millimeters).
Tolerances are ± .010 (0,25) unless indicated otherwise.



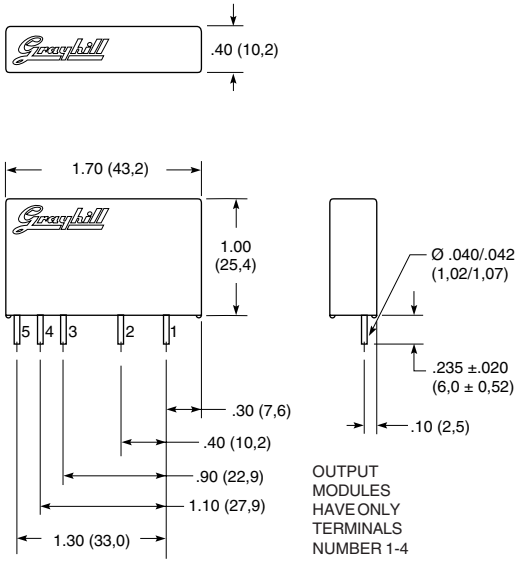
DIMENSIONS: Standard and Miniature Digital Modules

Dimensions shown in inches (and millimeters).
Tolerances are ± .010 (0,25) unless indicated otherwise.

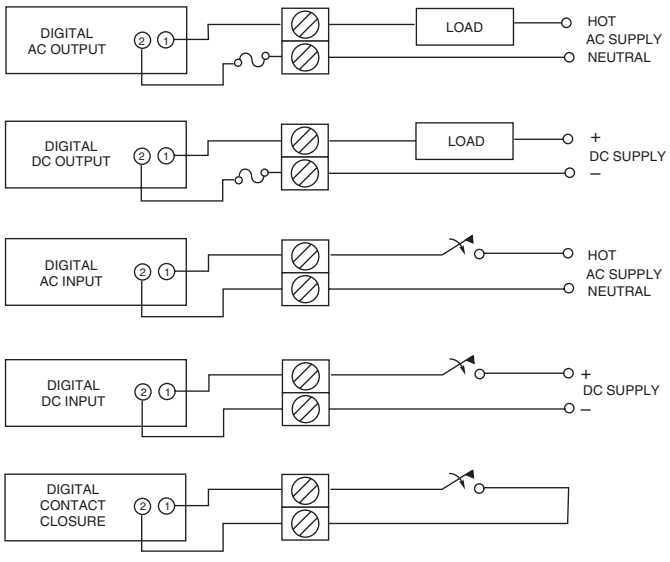
Standard Module



Miniature Module



WIRING DIAGRAM: Digital I/O Modules



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I/O MODULE SIZE

Miniature
Saves 35% Space

Standard
Compatible Industry Size

G5
Fused Outputs,
Integral LED

OpenLine®
Two Channel,
Fused Outputs,
Integral LED

FUNCTION

(Check Specifications for Input and Output combinations, Feature or Option availability.)

	Load	Control Vcc	Unique Options
Digital AC Output	120 Vac 220 Vac	5 Vdc 15 Vdc 24 Vdc 4.5-28 Vdc	Random Turn-on Normally Closed Manual Override Inductive Load

	Load	Control Vcc	Unique Options
Digital DC Output	60 Vdc 200 Vdc	5 Vdc 15 Vdc 24 Vdc 4.5-28 Vdc	Dry Contacts Manual Override

	Supply Vcc	Input Voltage	Unique Options
Digital AC Input	5 Vdc 15 Vdc 24 Vdc 4.5-28 Vdc	120 Vac 220 Vac	High DC Voltage Input

	Supply Vcc	Input Voltage	Unique Options
Digital DC Input	5 Vdc 15 Vdc 24 Vdc 4.5-28 Vdc	3 to 32 Vdc	10 to 32 Vdc/ 15 to 32 Vac 8 KHz Switching 35 to 60 Vac/Vdc Contact Closure

Test Digital I/O Modules

Module Calibrator/Programmer

The field programmer can be used to test, calibrate and transfer data to smart OpenLine® modules. On-board switches also allow testing of digital I/O modules. The programmer connects to a PC through an RS-232 serial port. Software is included to communicate with smart I/O modules.

ORDERING INFORMATION

Part Number	Description
Programmer/Calibrator	
70L-PROG	Field programmer/calibrator for OpenLine® I/O

FEATURES

- Transient Protection: Meets the requirements of IEEE 472, "Surge Withstanding Capability Test"
- SPST, Normally Open
- Zero Crossing Turn-On
- UL, CSA, CE, TÜV Certified
- Optical Isolation
- OpenLine® and G5 Modules Provide Replaceable 5x20 mm Glass Fuses
- Built-in Status LED
- Lifetime Warranty

70L-OAC 70G-OAC 70-OAC 70M-OAC

DIMENSIONS

For complete dimensional drawings, see pages L-4 or L-5.

FUSES

G5 Fuses are 5 Amp Littelfuse part number 217005 or equivalent. OpenLine® fuses are 3.15 Amp Littelfuse part number 2173.15.

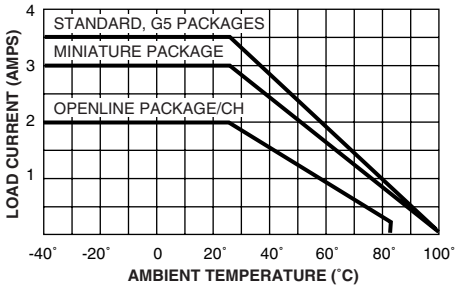


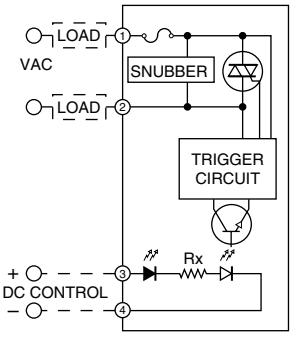
Figure 1

Maximum Current Versus Ambient Temperature

The chart indicates continuous current to limit the junction temperatures to 100°C. Information is based on steady state heat transfer in a 2 cubic foot sealed enclosure.

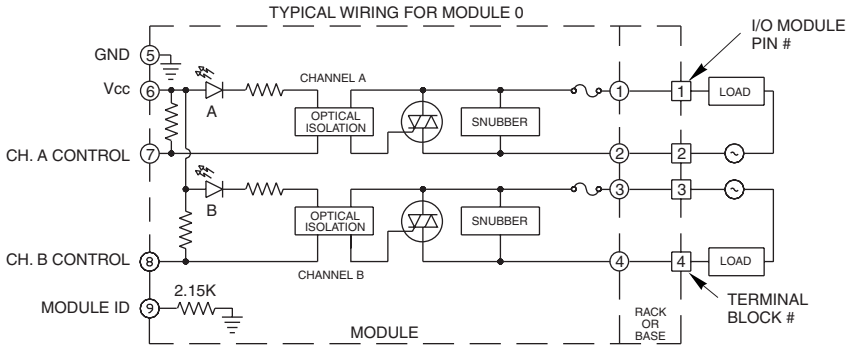
CIRCUITRY

Standard, Mini, G5



Fuse and status LED in G5 and OpenLine modules only.

OpenLine®



SPECIFICATIONS: By Package Style

Package Style		Std (70-)	Mini (70M-)	G5 (70G-)	OL (70L-)
Specifications	**Units**				
Load Current Range[1]	A rms	0.03 to 3.5	0.03 to 3.0	0.03 to 3.5	0.03 to 2.0/CH
Maximum 1 Cycle Surge[2]	A rms	80	80	80	30
Maximum Turn-On-Time (60 Hz)[3]	mSec	8.33	8.33	8.33	8.33
Maximum Turn-Off Time (60 Hz)	mSec	8.33	8.33	8.33	8.33
Static dv/dt[7]	V/µsec	3000	3000	3000	3000
Typ. Power Dissipation	W/A	1.0	1.0	1.0	1.0
Isolation Voltage[4]	V rms	4000	4000	4000	2500
Vibration[5]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-6
Mechanical Shock[6]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-27
Storage Temp. Range	°C	-40 to 125	-40 to 125	-40 to 125	-40 to 100
Operating Temp. Range	°C	-40 to 100	-40 to 100	-40 to 100	-40 to 85
Warranty		Lifetime	Lifetime	Lifetime	Lifetime

[1] See Figure 1 for derating.
[2] Maximum 10 cycle surge is 50% of 1 cycle surge. Application of maximum surge may not be repeated until module temperature has returned to its steady state value.
[3] Except 70-OAC5A5 which is 200 µSec and 70-OAC5A-11, 70M-OAC5A-11, and 70G-OAC5A-11 which are 100 µSec.
[4] Field to logic and channel-to-channel if Grayhill racks are used.
[5] MIL-STD-202, Method 204, 20 , 10-2000 Hz or IEC68-2-6, 0.15 mm/sec², 10-150 Hz.
[6] MIL-STD-202, Method 213, Condition F, 1500G or IEC68-2-27, 11 mS, 15g.
[7] Except part numbers with -L suffix which have a dv/dt rating of 200 V/µSec.

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SPECIFICATIONS: By Part Number

Standard and Miniature Modules

Type/Function		Grayhill Part Number					
Miniature, Normally Open, Random Turn-on			**70M-OAC5A-11**				
Miniature, Normally Open, Zero Voltage Turn-on (ZVT)		**70M-OAC5**	**70M-OAC5A**	**70M-OAC15**	**70M-OAC15A**	**70M-OAC24**	**70M-OAC24A**
Miniature, Normally Open, ZVT, Inductive Load		**70M-OAC5-L**	**70M-OAC5A-L**				
Standard, Normally Closed, Random Turn-on			**70-OAC5A5**				
Standard, Normally Open, Random Turn-on			**70-OAC5A-11**				**70-OAC24A-11**
Standard, Normally Open, ZVT		**70-OAC5**	**70-OAC5A**	**70-OAC15**	**70-OAC15A**	**70-OAC24**	**70-OAC24A**
Standard, Normally Open, ZVT, Inductive Load		**70-OAC5-L**	**70-OAC5A-L**				
Specifications	**Units**						
Nominal Line Voltage	Vac	120	240	120	240	120	240
Load Voltage Range	Vac	24-140	24-280	24-140	24-280	24-140	24-280
Minimum Peak Blocking Voltage	Volts	400	600	400	600	400	600
Maximum Off-state Leakage @ 60Hz	mA, rms	2	4	2	4	2	4
Nominal Logic Voltage (Vcc)	Vdc	5	5	15	15	24	24
Logic Voltage Range	Vdc	2.5-10	2.5-10	10-18	10-18	15-30	15-30
Max. Logic Supply Current @ Nominal Vcc	mA	16	16	9	9	9	9
Nominal Input Resistance (Rx)	Ω	240	240	1800	1800	2700	2700
Minimum Drop Out Voltage	Vdc	1	1	1	1	1	1
Maximum Reverse Logic Voltage	Vdc	-5	-5	-5	-5	-5	-5

G5 Modules

Type/Function		Grayhill Part Number					
G5 Fusible, Normally Open, ZVT		**70G-OAC5**	**70G-OAC5A**	**70G-OAC15**	**70G-OAC15A**	**70G-OAC24**	**70G-OAC24A**
G5 Fusible, Normally Open, ZVT, Inductive Load		**70G-OAC5-L**	**70G-OAC5A-L**	**70G-OAC15-L**	**70G-OAC15A-L**	**70G-OAC24-L**	**70G-OAC24A-L**
G5 Fusible, Normally Open, Random Turn-on			**70G-OAC5A-11**				
Specifications	**Units**						
Nominal Line Voltage	Vac	120	240	120	240	120	240
Load Voltage Range	Vac	24-140	24-280	24-140	24-280	24-140	24-280
Minimum Peak Blocking Voltage	Volts	400	600	400	600	400	600
Maximum Off-state Leakage @ 60Hz	mA, rms	2	4	2	4	2	4
Nominal Logic Voltage (Vcc)	Vdc	5	5	15	15	24	24
Logic Voltage Range	Vdc	4-6	4-6	8-20	8-20	18-32	18-32
Max. Logic Supply Current @ Nominal Vcc	mA	20	20	12	12	8	8
Nominal Input Resistance (Rx)	W	100	100	1000	1000	2700	2700
Minimum Drop Out Voltage	Vdc	1	1	1	1	1	1
Maximum Reverse Logic Voltage	Vdc	-5	-5	-5	-5	-5	-5

OpenLine® Modules

Type/Function		Grayhill Part Number	
Dual, Fusible, Normally Open, ZVT		**70L-OAC**	**70L-OACA**
Dual, Fusible, Normally Open, ZVT, Inductive Load		**70L-OAC-L**	**70L-OACA-L**
Specifications	**Units**		
Nominal Line Voltage	Vac	120	240
Load Voltage Range	Vac	24-140	24-280
Minimum Peak Blocking Voltage	Volts	600	600
Maximum Off-State Leakage @ 60 Hz	mA, rms	2	4
Nominal Logic Voltage	Vdc	5	5
Logic Voltage Range	Vdc	4.5-28	4.5-28
Max. Logic Supply Current @ Nominal Vcc	mA	7/CH	7/CH
Module ID Resistance to Logic Ground	Ω	2.15K	2.15K
Minimum Drop Out Voltage	Vdc	1	1

Available from your local Grayhill Distributor.
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

FEATURES

- Transient Protection: Meets the requirements of IEEE 472, "Surge Withstanding Capability Test"
- SPST, Normally Open
- UL, CSA, CE, TÜV Certified
- Optical Isolation
- OpenLine® and G5 Modules Provide Replaceable 5x20mm Glass Fuses
- Built-in Status LED
- Lifetime Warranty

70L-ODC 70G-ODC 70-ODC 70M-ODC

DIMENSIONS

For complete dimensional drawings, see pages L-4 or L-5.

FUSES

G5 Fuses are 5 Amp Littelfuse part number 217005 or equivalent. OpenLine® fuses are 3.15 Amp Littelfuse part number 2173.15.

Fuse kits available, see page L-104.

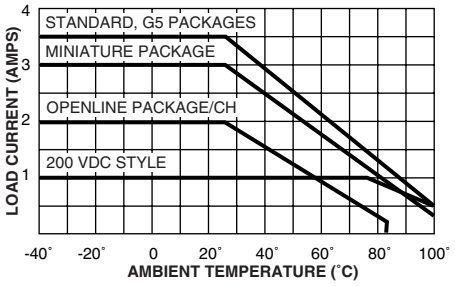


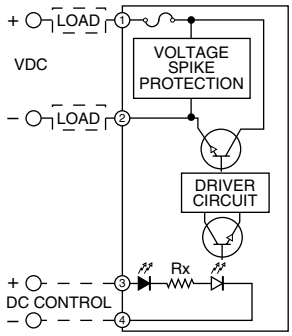
Figure 1

Maximum Current Versus Ambient Temperature

The chart indicates continuous current to limit the junction temperatures to 115°C. Information is based on steady state heat transfer in a 2 cubic foot sealed enclosure.

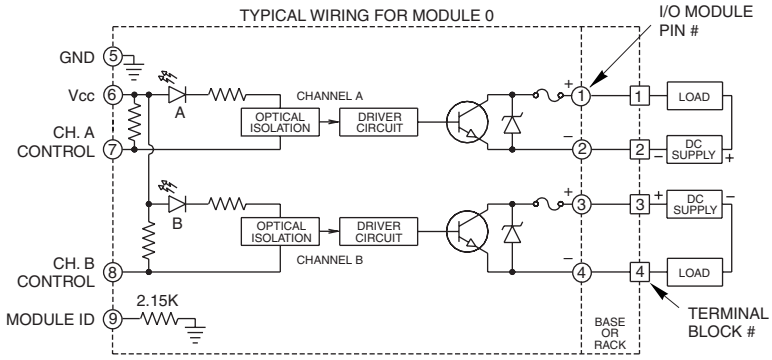
CIRCUITRY

Standard, Mini, G5



Fuse and status LED in G5 and OpenLine modules only.

OpenLine®



SPECIFICATIONS: By Package Style

Package Style		Std (70-)	Mini (70M-)	G5 (70G-)	OL (70L-)
Specifications	**Units**				
Load Current Range[1]	A	0.02-3.5	0.02-3.0	0.02-3.5	0.02-2.0/CH
Surge Current for 1 Sec.	A	5	5	5	5
Maximum Reverse Logic Voltage	Vdc	-5	-5	-5	-5
Isolation Voltage[2]	Vrms	4000	4000	4000	2500
Vibration[3]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-6
Mechanical Shock[4]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-27
Storage Temp. Range	°C	-40 to 125	-40 to 125	-40 to 125	-40 to 100
Operating Temp. Range	°C	-40 to 100	-40 to 100	-40 to 100	-40 to 85
Warranty		Lifetime	Lifetime	Lifetime	Lifetime

[1] See Figure 1 for derating.
[2] Field to logic and channel-to-channel if Grayhill racks are used.
[3] MIL-STD-202, Method 204, 20 G, 10-2000 Hz or IEC68-2-6, 0.15 mm/sec², 10-150 Hz.
[4] MIL-STD-202, Method 213, Condition F, 1500 G or IEC68-2-27, 11 mS, 15g.

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SPECIFICATIONS: By Part Number

Standard and Miniature Modules

Type/Function		Grayhill Part Number						
Miniature, Normally Open		70M-ODC5	70M-ODC5A	70M-ODC5B	70M-ODC15	70M-ODC15B	70M-ODC24	70M-ODC24B
Standard, Normally Open		70-ODC5	70-ODC5A	70-ODC5B	70-ODC15	70-ODC15B	70-ODC24	70-ODC24B
Specifications	**Units**							
Maximum Line Voltage	Vdc	60	200	60	60	60	60	60
Load Voltage Range	Vdc	3-60	4-200	3-60	3-60	3-60	3-60	3-60
Max. Off-State Leakage @ Max. Line	mA	1.5	0.01	0.01	1.5	0.01	1.5	0.01
Maximum Turn-On Time	µSec	20	75	75	20	75	20	75
Maximum Turn-Off Time	µSec	50	750	500	50	500	50	500
Typ. Power Dissipation	W/A	1	1.5	1	1	1	1	1
Clamping Voltage	Vdc	80	360	80	80	80	80	80
Nominal Logic Voltage (Vcc)	Vdc	5	5	5	15	15	24	24
Logic Voltage Range	Vdc	2.5-10	2.5-9	2.5-10	10-18	10-18	15-30	15-30
Maximum Logic Supply Current @ Nominal Vcc	mA	14	18	14	9	9	9	9
Nominal Input Resistance (Rx)	Ω	300	220	300	1800	1800	2700	2700
Minimum Drop Out Voltage	Vdc	1	1	1	1	1	1	1

G5 and OpenLine® Modules

Type/Function		Grayhill Part Number						
Fusible, Normally Open		70G-ODC5	70G-ODC5A	70G-ODC5B	70G-ODC15	70G-ODC15B	70G-ODC24	70G-ODC24B
Specifications	**Units**							
Maximum Line Voltage	Vdc	60	200	60	60	60	60	60
Load Voltage Range	Vdc	3-60	4-200	3-60	3-60	3-60	3-60	3-60
Max. Off-State Leakage @ Max. Line	mA	1.5	0.01	0.01	1.5	0.01	1.5	0.01
Maximum Turn-On Time	µSec	20	75	75	20	75	20	75
Maximum Turn-Off Time	µSec	50	750	500	50	500	50	500
Typ. Power Dissipation	W/A	1	1.5	1	1	1	1	1
Clamping Voltage	Vdc	80	360	80	80	80	80	80
Nominal Logic Voltage (Vcc)	Vdc	5	5	5	15	15	24	24
Logic Voltage Range	Vdc	4-6	4-6	4-6	10-20	10-20	18-32	18-32
Maximum Logic Supply Current @ Nominal Vcc	mA	13	13	13	9	9	9	9
Nominal Input Resistance (Rx)	Ω	150	150	150	1500	1500	2700	2700
Minimum Drop Out Voltage	Vdc	1	1	1	1	1	1	1

OpenLine® Modules

Type/Function		Grayhill Part Number		
Dual, Fusible, Normally Open		70L-ODC	70L-ODCA	70L-ODCB
Specifications	**Units**			
Maximum Line Voltage	Vdc	60	200	60
Load Voltage Range	Vdc	3-60	4-200	3-60
Max. Off-State Leakage @ Max. Line	mA	1.5	.01	.01
Maximum Turn-On Time	µSec	20	75	75
Maximum Turn-Off Time	µSec	50	750	500
Typ. Power Dissipation	WA	1	1.5	1
Clamping Voltage	Vdc	80	360	80
Nominal Logic Voltage (Vcc)	Vdc	5	5	5
Logic Voltage Range	Vdc	4.5-28	4.5-28	4.5-28
Maximum Logic Supply Current @ Nominal Vcc	mA	7/CH	7/CH	7/CH
Module ID Resistance to Logic Ground	Ω	2.15K	2.15K	2.15K
Minimum Drop Out Voltage	Vdc	1	1	1

Available from your local Grayhill Distributor.
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

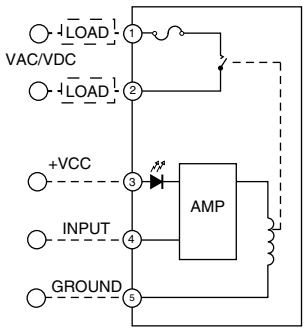
FEATURES

- SPST, Normally Open
- UL, CSA Certified
- 1500 Vac Optical Isolation
- G5 and OpenLine® Modules Provide Replaceable 5x20mm Glass Fuse
- Built-in Status LED
- Lifetime Warranty
- Switch AC or DC with the Same Module
- Very Low Off-State Leakage Current for AC loads
- No Off-State Leakage Current for DC loads

70L-ODC5R 70G-ODCR/OACRLY 70-ODCR/OACRLY 70M-ODCR

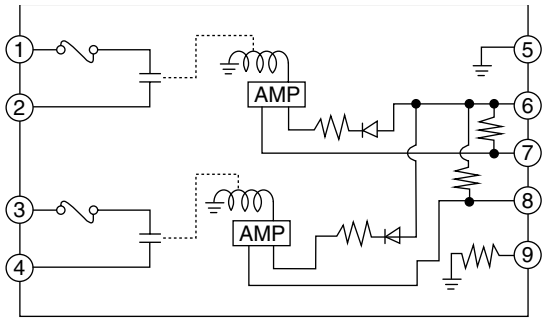
CIRCUITRY

Standard, Mini, G5



Fuse and status LED in G5 modules only.

OpenLine®



SPECIFICATIONS BY PACKAGE STYLE

Package Style		Std (70-)	Mini (70M-)	G5 (70G-)	OpenLine® (70L-)
Specifications	**Units**				
Isolation Voltage[1]	Vrms	1500	1500	1500	1500
Vibration[2]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-6
Mechanical Shock[3]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-7
Storage Temp. Range	°C	-40 to 70	-40 to 70	-40 to 70	-40 to 70
Operating Temp. Range	°C	-40 to 70	-40 to 70	-40 to 70	-40 to 70

[1] Field to logic and channel-to-channel if Grayhill racks are used.
[2] MIL-STD-202, Method 204, 20 G, 10-2000 Hz or IEC68-2-6, 0.15 mm/sec², 10-150 Hz.
[3] MIL-STD-202, Method 213, Condition F, 1500 G or IEC68-2-27, 11 mS, 15g.

SPECIFICATIONS BY PART NUMBER

Standard and Miniature Modules

Type/Function		Grayhill Part Number		
Miniature, Normally Open		**70M-ODC5R**		**70M-ODC24R**
Standard, Normally Open		**70-ODC5R**	**70-OAC5RLY**	**70-ODC24R**
Specifications	**Units**			
Maximum Line Voltage	Vdc/Vac	100/120	110/250	100/120
Load Voltage Range	Vdc/Vac	0-100/0-120	0-110/0-250	0-100/0-120
Maximum Contact Rating	W	10	90	10
Maximum Switching Current[1]	A	0.5	3.0	0.5
Maximum Carry Current[1]	A	1.0	5.0	1.0
Minimum Life Expectancy				
@ 10 Vdc/10 mA	Cycles	200×10^6	—	200×10^6
@ 48 Vdc/100 mA	Cycles	500×10^3	—	500×10^3
@ 120 Vac/80 mA	Cycles	500×10^3	—	500×10^3
@ 30 Vdc or 230 Vac/3A	Cycles	—	100×10^6	—
Maximum Contact Resistance	mΩ	250	250	250
Maximum Off-State Leakage	mA	.002	.002	.002
Maximum Turn-On Time[2]	mSec	1	11	1
Maximum Turn-Off Time[2]	mSec	1	11	1
Nominal Logic Voltage (Vcc)	Vdc	5	5	24
Logic Voltage Range	Vdc	4.8-6.0	4.8-6.0	20-30
Maximum Logic Supply Current				
@ Nominal Vcc	mA	10	26	16
Nominal Input Resistance (Rx)	Ω	500	200	1700
Minimum Drop-Out Voltage	Vdc	2.5	4.8	23
Maximum Reverse Logic Voltage	Vdc	-5	-5	-5

G5 and OpenLine® Modules

Type/Function		Grayhill Part Number			
G5 Fusible, Normally Open		**70L-ODC5R**	**70G-ODC5R**	**70G-OAC5RLY**	**70G-ODC24R**
Specifications	**Units**				
Maximum Line Voltage	Vdc/Vac	200/200	100/120	110/250	100/120
Load Voltage Range	Vdc/Vac	0-200/0-200	0-100/0-120	0-110/0-250	0-100/0-120
Maximum Contact Rating	W	10	10	90	10
Maximum Switching Current[1]	A	0.5	0.5	3.0	0.5
Maximum Carry Current[1]	A	1.5	1.0	5.0	1.0
Minimum Life Expectancy					
@ 1Vdc/10 mA	Cycles	1000×10^6	—	—	—
@ 10 Vdc/10 mA	Cycles	—	200×10^6	—	200×10^6
@ 48 Vdc/100 mA	Cycles	—	500×10^3	—	500×10^3
@ 120 Vac/80 mA	Cycles	500×10^3	500×10^3	—	500×10^3
@ 30 Vdc or 230 Vac/3A	Cycles		—	100×10^6	—
Maximum Contact Resistance	mΩ	300	250	250	250
Maximum Turn-On Time[2]	mSec	1	1	11	1
Maximum Turn-Off Time[2]	mSec	1	1	11	1
Max. Off-State Leakage @ Max. Line	mA	.002	.002	.002	.002
Nominal Logic Voltage (Vcc)	Vdc	5	5	5	24
Logic Voltage Range	Vdc	4.5-6.0	4.8-6.0	4.8-6.0	18-32
Max. Logic Supply Current					
@ Nominal Vcc	mA	30 max./channel	10	26	23
Nominal Input Resistance (Rx)	Ω	167	500	200	1200
Minimum Drop-Out Voltage	Vdc	4.5	1	1	23

[1] Inductive loads require diode suppression or RC network.
[2] Times include debounce.

Available from your local Grayhill Distributor.
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

FEATURES

- Integral Three Position Manual On/Manual Off and Automatic Control Toggle Switch
- Transient Protection: Meets the requirements of IEEE 472, “Surge Withstanding Capability Test”
- UL, CSA Certified
- Optical Isolation
- G5 Modules Provide Replaceable 5x20 mm Glass Fuse
- Built-in Status LED

Maximum Current Versus Ambient Temperature

The chart indicates continuous current to limit the junction temperatures to 100°C. Information is based on steady state heat transfer in a two cubic foot sealed enclosure.

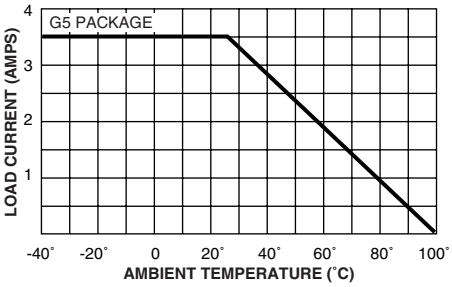
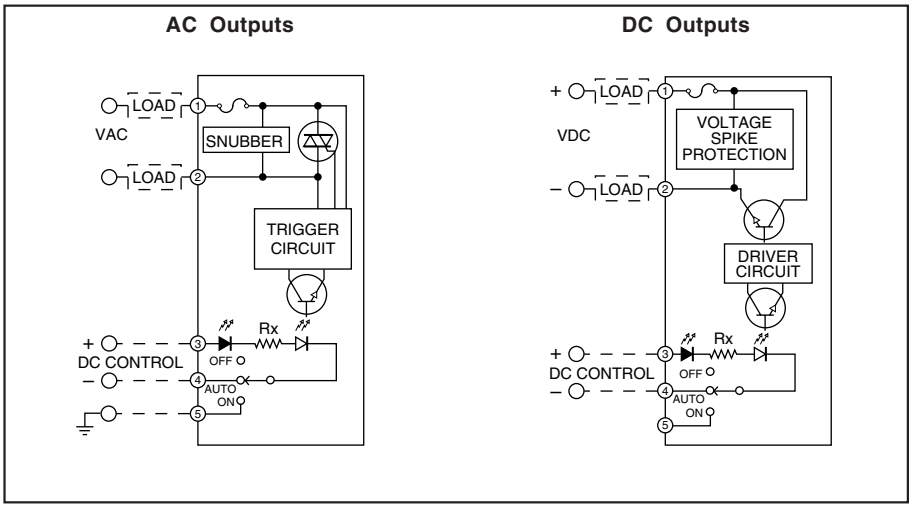


Figure 1

CIRCUITRY



Maximum Peak Surge Current Versus Surge Duration (AC Outputs)

Information is based on a supply frequency of 60 Hz sinusoidal and a resistive or inductive load. Application of maximum surge current may not be repeated until the module temperature has returned to its steady state value.

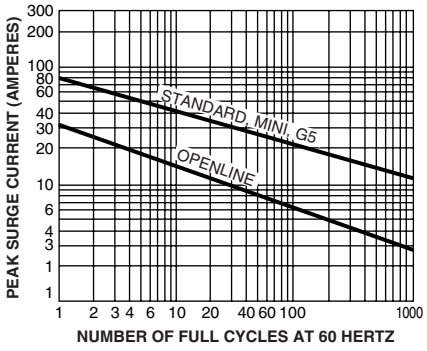


Figure 2

FUSES

G5 Fuses are 5 Amp Littelfuse part number 217005 or equivalent.

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SPECIFICATIONS: All Modules*

Output Specifications

Load Current Range (rms): 0.03 to 3.5 Amps, Maximum current is derated as shown in Figure 1.
Maximum Surge Current (peak): 80 Amps at 60 Hz, 1 cycle as qualified by Figure 2 for AC outputs. 5 Amp maximum for 1 second for DC outputs.
Turn-on Time (60 Hz): 8.3 mSec maximum for AC outputs. 20 µSec maximum for DC outputs.
Turn-off Time (60 Hz): 8.3 mSec maximum for AC outputs. 50 µSec maximum for DC outputs.
ON State Voltage Drop (peak): 1.5 volts max.
Power Dissipation: 1.0 Watt/Amp typical

General Characteristics

Isolation Voltage Field to Logic: 4000 Vac (rms) minimum
Vibration: 20 G's peak or .06" double amplitude 10–2000 Hz per MIL–STD–202, Method 204, Condition D
Mechanical Shock: 1500 G's 0.5 mS half-sine per MIL–STD–202, Method 213, Condition F
Storage Temperature Range: -40°C to +125°C
Operating Temperature Range: -40°C to +100°C

*Specifications apply over operating temperature range unless noted otherwise.

SPECIFICATIONS: By Part Number

AC Outputs

Type/Function		Grayhill Part Number			
G5, Zero Voltage Turn On, Manual Override		70G-OAC5MA	70G-OAC5AMA	70G-OAC24MA	70G-OAC24AMA
Specifications	**Units**				
Nominal Line Voltage	Vac	120	240	120	240
Load Voltage Range	Vac	24-140	24-280	24-140	24-280
Minimum Peak Blocking Voltage	Volts	400	600	400	600
Maximum Off-state Leakage @ 60Hz	mA, rms	2	4	2	4
Nominal Logic Voltage (Vcc)	Vdc	5	5	24	24
Logic Voltage Range	Vdc	4-6	4-6	18-32	18-32
Max. Logic Supply Current @ Nominal Vcc	mA	20	20	8	8
Nominal Input Resistance (Rx)	Ω	100	100	2700	2700
Minimum Drop-Out Voltage	Vdc	1	1	1	1
Maximum Reverse Logic Voltage	Vdc	-5	-5	-5	-5
Maximum Zero Voltage Offset	(Vpeak)	8	8	8	8
Frequency Range	(Hz)	25-70	25-70	25-70	25-70

DC Outputs

Type/Function		Grayhill Part Number	
G5 Manual Override		70G-ODC5MA	70G-ODC24MA
Specifications	**Units**		
Maximum Line Voltage	Vdc	60	60
Load Voltage Range	Vdc	3-60	3-60
Maximum Off-state Leakage @ 60 Vdc	mA	1.5	1.5
Maximum Turn-on Time	µSec	20	20
Maximum Turn-off Time	µSec	50	50
Nominal Logic Voltage (Vcc)	Vdc	5	24
Logic Voltage Range	Vdc	4-6	18-32
Max. Logic Supply Current @ Nominal Vcc	mA	13	9
Nominal Input Resistance (Rx)	Ω	150	2700
Minimum Drop-Out Voltage	Vdc	1	1
Maximum Reverse Logic Voltage	Vdc	-5	-5
Maximum Clamping Voltage	Vdc	80	80

Available from your local Grayhill Distributor. For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

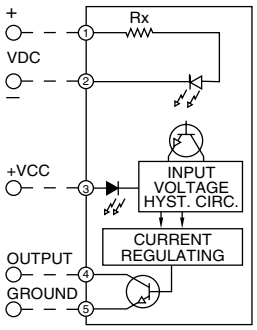
FEATURES

- Transient Protection: Meets the requirements of IEEE 472, "Surge Withstanding Capability Test"
- UL, CSA, CE, TÜV Certified (TÜV not available on OpenLine)
- Optical Isolation
- OpenLine® and G5 Modules have Built-in Status LED
- Lifetime Warranty

70L-IAC 70G-IAC 70-IAC 70M-IAC

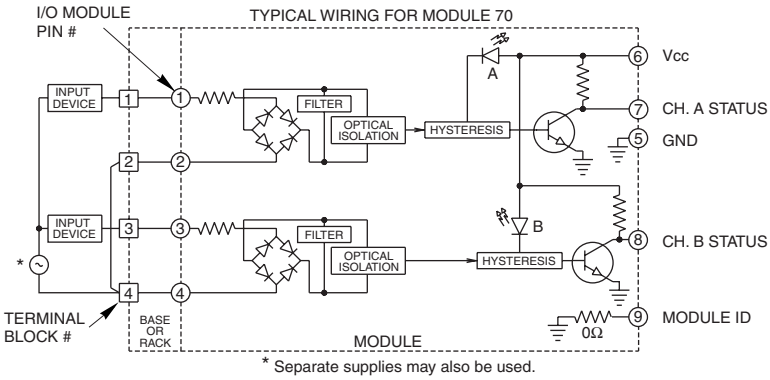
CIRCUITRY

Standard, Mini, G5



Status LED in G5 modules only.

OpenLine®



* Separate supplies may also be used.

SPECIFICATIONS: By Package Style

Package Style		Std (70-)	Mini (70M-)	G5 (70G-)	OL (70L-)
Specifications	**Units**				
Output Current Range	mA	1-50	1-50	1-50	1-50
Minimum Output Breakdown Voltage	Vdc	50	50	50	50
Maximum Turn-On Time	mS	20	20	20	20
Maximum Turn-Off Time	mS	20	20	20	20
Isolation Voltage[1]	Vrms	4000	4000	4000	2500
Vibration[2]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-6
Mechanical Shock[3]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-27
Storage Temp. Range	°C	-40 to +125	-40 to +125	-40 to +125	-40 to +100
Operating Temp. Range	°C	-40 to +100	-40 to +100	-40 to +100	-40 to +85
Warranty		Lifetime	Lifetime	Lifetime	Lifetime

[1] Field to logic and channel-to-channel if Grayhill racks are used.
[2] MIL-STD-202, Method 204, 20 G, 10-2000 Hz or IEC68-2-6, 0.15 mm/sec², 10-150 Hz.
[3] MIL-STD-202, Method 213, Condition F, 1500 G or IEC68-2-27, 11 mS, 15g.

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SPECIFICATIONS: By Part Number

Standard and Miniature Modules

Type/Function		Grayhill Part Number					
Miniature		**70M-IAC5**	**70M-IAC5A**	**70M-IAC15**	**70M-IAC15A**	**70M-IAC24**	**70M-IAC24A**
Standard		**70-IAC5**	**70-IAC5A**	**70-IAC15**	**70-IAC15A**	**70-IAC24**	**70-IAC24A**
Specifications	**Units**						
Nominal Input Voltage	Vac	120	240	120	240	120	240
Input Voltage Range[1]	Vac/Vdc	90-140	180-280	90-140	180-280	90-140	180-280
Input Current @ Maximum Input Voltage	mA, rms	8	6	8	6	8	6
Nominal Input Resistance (Rx)	Ω	22K	60K	22K	60K	22K	60K
Maximum Pick-Up Voltage (Output Low)	Vac	90	180	90	180	90	180
Minimum Drop-Out Voltage (Output High)	Vac	25	50	25	50	25	50
Nominal Logic Voltage (Vcc)	Vdc	5	5	15	15	24	24
Logic Voltage Range	Vdc	3-6	3-6	8-18	8-18	15-30	15-30
Max. Logic Supply Current @ Nominal Vcc	mA	10	10	10	10	10	10

G5 Modules

Type/Function		Grayhill Part Number					
G5, Status LED		**70G-IAC5**	**70G-IAC5A**	**70G-IAC15**	**70G-IAC15A**	**70G-IAC24**	**70G-IAC24A**
Specifications	**Units**						
Nominal Input Voltage	Vac	120	240	120	240	120	240
Input Voltage Range[1]	Vac/Vdc	90-140	180-280	90-140	180-280	90-140	180-280
Input Current @ Maximum Input Voltage	mA, rms	8	6	8	6	8	6
Nominal Input Resistance (Rx)	Ω	22K	60K	22K	60K	22K	60K
Maximum Pick-Up Voltage (Output Low)	Vac	90	180	90	180	90	180
Minimum Drop-Out Voltage (Output High)	Vac	25	50	25	50	25	50
Nominal Logic Voltage (Vcc)	Vdc	5	5	15	15	24	24
Logic Voltage Range	Vdc	4.5-6	4.5-6	10-18	10-18	17-30	17-30
Max. Logic Supply Current @ Nominal Vcc	mA	10	10	10	10	10	10

OpenLine® Modules

Type/Function		Grayhill Part Number	
Dual, Status LED		**70L-IAC**	**70L-IACA**
Specifications	**Units**		
Nominal Input Voltage	Vac	120	240
Input Voltage Range[1]	Vac/Vdc	0-140	0-280
Input Current @ Max. Input Voltage	mA, rms	8	6
Nominal Input Resistance (Rx)	Ω	22K	64K
Max. Pick-Up Voltage (Output Low)	Vac	90	180
Min. Drop-Out Voltage (Output High)	Vac	25	50
Nominal Logic Voltage (Vcc)	Vdc	5	5
Logic Voltage Range	Vdc	4.5-28	4.5-28
Max. Logic Supply Current @ Nominal Vcc	mA	6/CH	6/CH
Module ID Resistance to Logic Ground	Ω	0	0

Available from your local Grayhill Distributor. For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

[1] For input voltages in the range of 15-32 Vac, or 35-60 Vac, see DC input Modules with the NP or G suffix.

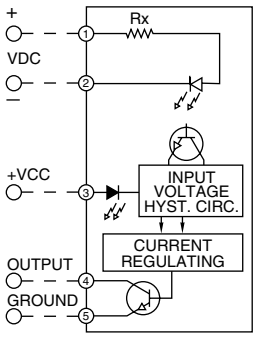
FEATURES

- Transient Protection: Meets the requirements of IEEE 472, "Surge Withstanding Capability Test"*
- Non-Polarized Types Provide Inputs For AC or DC
- UL, CSA, CE , TÜV Certified (TÜV not available on OpenLine)
- Optical Isolation
- OpenLine® and G5 Modules have Built-in Status LED

70L-IDC 70G-IDC 70-IDC 70M-IDC

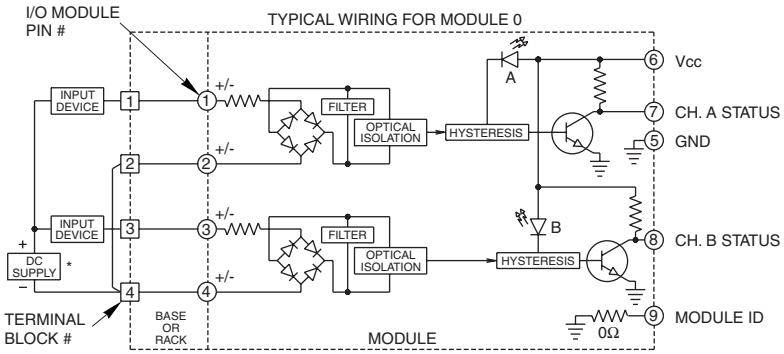
CIRCUITRY

Standard, Mini, G5



Status LED in G5 modules only.

OpenLine®



* Separate supplies may also be used.

SPECIFICATIONS: By Package Style

Package Style		Std (70-)	Mini (70M-)	G5 (70G-)	OL (70L-)
Specifications	**Units**				
Output Current Range	mA	1-50	1-50	1-50	1-50
Min. Output Breakdown Voltage	Vdc	50	50	50	50
Isolation Voltage[1]	Vrms	4000	4000	4000	2500
Vibration[2]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-6
Mechanical Shock[3]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-27
Storage Temp. Range	°C	-40 to +125	-40 to +125	-40 to +125	-40 to +100
Operating Temp. Range	°C	-40 to +100	-40 to +100	-40 to +100	-40 to +85
Warranty		Lifetime	Lifetime	Lifetime	Lifetime

[1] Field to logic and channel-to-channel if Grayhill racks are used.
[2] MIL-STD-202, Method 204, 20 G, 10-2000 Hz or IEC68-2-6, 0.15 mm/sec², 10-150 Hz.
[3] MIL-STD-202, Method 213, Condition F, 1500 G or IEC68-2-27, 11 mS, 15g.

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SPECIFICATIONS: By Part Number

Standard and Miniature Modules

Type/Function		Grayhill Part Number			
Miniature, Non-Polarized		70M-IDC5G	70M-IDC5NP	70M-IDCI5NP	
Standard, Non-Polarized		70-IDC5G	70-IDC5NP	70-IDC15NP	70-IDC24NP
Specifications	**Units**				
Maximum Input Voltage	Vac/Vdc	60	32	32	32
Input Voltage Range[1]	Vac/Vdc	35-60	15-32/10-32	15-32/10-32	15-32/10-32
Input Current @ Max. Input Voltage	mA	6	18	18	18
Maximum Turn-on Time	mSec	10	5	5	5
Maximum Turn-off Time	mSec	10	5	5	5
Nominal Input Resistance (Rx)	Ω	10K	1.8K	1.8K	1.8K
Maximum Pick Up Voltage (Output Low)	Vac/Vdc	35	15/10	15/10	15/10
Minimum Drop Out Voltage (Output High)	Vac/Vdc	9	3	3	3
Nominal Logic Voltage (Vcc)	Vdc	5	5	15	24
Logic Voltage Range	Vdc	3-6	3-6	8-18	15-30
Max. Logic Supply Current @ Nominal Vcc	mA	10	10	10	10

G5 Modules

Type/Function		Grayhill Part Number			
G5, Non-Polarized, Status LED		70G-IDC5G	70G-IDC5NP	70G-IDC15NP	70G-IDC24NP
Specifications	**Units**				
Maximum Input Voltage	Vac/Vdc	60	32	32	32
Input Voltage Range[1]	Vac/Vdc	35-60	15-32/10-32	15-32/10-32	15-32/10-32
Input Current @ Max. Input Voltage	mA	6	18	18	18
Maximum Turn-on Time	mSec	10	5	5	5
Maximum Turn-off Time	mSec	10	5	5	5
Nominal Input Resistance (Rx)	Ω	10K	1.8K	1.8K	1.8K
Maximum Pick Up Voltage (Output Low)	Vac/Vdc	35	15/10	15/10	15/10
Minimum Drop Out Voltage (Output High)	Vac/Vdc	9	3	3	3
Nominal Logic Voltage (Vcc)	Vdc	5	5	15	24
Logic Voltage Range: Std & Mini	Vdc	4.5-6	4.5-6	10-18	17-30
Max. Logic Supply Current @ Nominal Vcc	mA	10	10	10	10

OpenLine® Modules

Type/Function		Grayhill Part Number	
Dual, Non-Polarized, Status LED		70L-IDCG	70L-IDCNP
Specifications	**Units**		
Maximum Input Voltage	Vac/Vdc	60	32
Input Voltage Range[1]	Vac/Vdc	35-60	15-32/10-32
Input Current @ Max. Input Voltage	mA	6	17
Maximum Turn-on Time	mSec	10	5
Maximum Turn-off Time	mSec	10	5
Nominal Input Resistance (Rx)	Ω	10.6K	1.9K
Maximum Pick Up Voltage (Output Low)	Vac/Vdc	35	15/10
Minimum Drop Out Voltage (Output High)	Vac/Vdc	9	3
Nominal Logic Voltage (Vcc)	Vdc	5	5
Logic Voltage Range	Vdc	4.5-28	4.5-28
Max. Logic Supply Current @ Nominal Vcc	mA	6/CH	6/CH
Module ID Resistance to Logic Ground	Ω	0	0

Available from your local Grayhill Distributor. For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

[1] For input voltages in the range of 90 to 140 Vdc, use AC input modules 70-IAC5, 70M-IAC5, 70G-IAC5 or 70L-IAC. For input voltages in the range of 180 to 280 Vdc, use AC input modules 70-IAC5A, 70M-IAC5A, 70G-IAC5A or 70L-IACA.

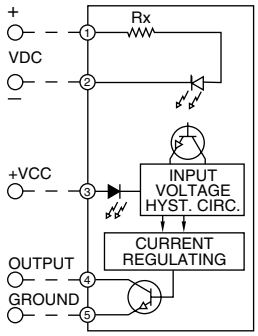
FEATURES

- Fast Switching Polarized Input Types
- UL, CSA, CE, TÜV Certified (TÜV not available on OpenLine®)
- Optical Isolation
- OpenLine® and G5 Modules have Built-in Status LED

70L-IDC 70G-IDC 70-IDC 70M-IDC

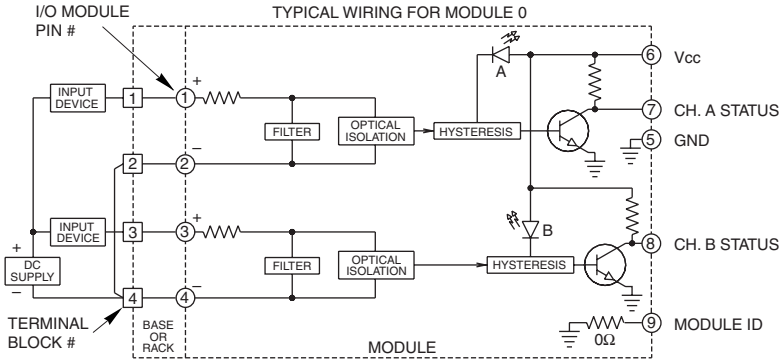
CIRCUITRY

Standard, Mini, G5



Status LED in G5 modules only.

OpenLine®



SPECIFICATIONS: By Package Style

Package Style		Std (70-)	Mini (70M-)	G5 (70G-)	OL (70L-)
Specifications	**Units**				
Output Current Range	mA	1-50	1-50	1-50	1-50
Minimum Output Breakdown Voltage	Vdc	50	50	50	50
Isolation Voltage[1]	Vrms	4000	4000	4000	2500
Vibration[2]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-6
Mechanical Shock[3]		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-27
Storage Temp. Range	°C	-40 to 125	-40 to 125	-40 to 125	-40 to 100
Operating Temp. Range	°C	-40 to 100	-40 to 100	-40 to 100	-40 to 85
Warranty		Lifetime	Lifetime	Lifetime	Lifetime

[1] Field to logic and channel-to-channel if Grayhill racks are used.
[2] MIL-STD-202, Method 204, 20G, 10-2000 Hz or IEC68-2-6, 0.15 mm/sec², 10-150 Hz.
[3] MIL-STD-202, Method 213, Condition F, 1500G or IEC68-2-27, 11 mS, 15g.

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SPECIFICATIONS: By Part Number

Standard and Miniature Modules

Type/Function		Grayhill Part Number				
Miniature, Polarized		**70M-IDC5**			**70M-IDC15**	**70M-IDC24**
Standard, Non-Polarized		**70-IDC5**	**70-IDC5B**	**70-IDC5K**	**70-IDC15**	**70-IDC24**
Specifications	**Units**					
Maximum Input Voltage	Vdc	32	32	16	32	32
Input Voltage Range[1]	Vdc	3-32	3-32	2.5-16	3-32	3-32
Input Current @ Maximum Input Voltage	mA	18	18	30	18	18
Maximum Turn-On Time	mSec	0.20	0.050	0.025	0.20	0.20
Maximum Turn-Off Time	mSec	0.40	0.075	0.030	0.40	0.40
Nominal Input Resistance (Rx)	Ω	1.8K	1.8K	500	1.8K	1.8K
Maximum Pick-Up Voltage (Output Low)	Vdc	3	3	2.5	3	3
Minimum Drop-Out Voltage (Output High)	Vdc	1	1	1	1	1
Nominal Logic Voltage (Vcc)	Vdc	5	5	5	15	24
Logic Voltage Range	Vdc	3-6	3-6	3.5-6	8-18	15-30
Max. Logic Supply Current @ Nominal Vcc	mA	10	18	18	10	10

G5 Modules

Type/Function		Grayhill Part Number					
G5, Polarized, Status LED		**70G-IDC5**	**70G-IDC5B**	**70G-IDC5D**	**70G-IDC5K**	**70G-IDC15**	**70G-IDC24**
Specifications	**Units**						
Maximum Input Voltage	Vdc	32	32	28	16	32	32
Input Voltage Range[1]	Vdc	3-32	3-32	2.5-28	2.5-16	3-32	3-32
Input Current @ Maximum Input Voltage	mA	18	18	23	30	18	18
Maximum Turn-On Time	mSec	0.20	0.050	0.050	0.025	0.20	0.20
Maximum Turn-Off Time	mSec	0.40	0.075	0.075	0.030	0.40	0.40
Nominal Input Resistance (Rx)	Ω	1.8K	1.8K	1.2K	500	1.8K	1.8K
Maximum Pick-Up Voltage (Output Low)	Vdc	3	3	2.5	2.5	3	3
Minimum Drop-Out Voltage (Output High)	Vdc	1	1	1	1	1	1
Nominal Logic Voltage (Vcc)	Vdc	5	5	5	5	15	24
Logic Voltage Range	Vdc	4.5-6	4.5-6	4.5-6	4.5-6	10-18	17-30
Max. Logic Supply Current @ Nominal Vcc	mA	10	18	10	18	10	10

OpenLine® Modules

Type/Function		Grayhill Part Number	
Dual, Polarized		**70L-IDC**	**70L-IDCB**
Specifications	**Units**		
Maximum Input Voltage	Vdc	32	32
Input Voltage Range[1]	Vdc	0-32	0-32
Input Current @ Max. Input Voltage	mA	18	18
Maximum Turn-on Time	mSec	0.20	0.05
Maximum Turn-off Time	mSec	0.40	0.075
Nominal Input Resistance (Rx)	Ω	1800	900
Maximum Pick-Up Voltage (Output Low)	Vdc	3	3
Minimum Drop-Out Voltage (Output High)	Vdc	0.9	0.9
Nominal Logic Voltage (Vcc)	Vdc	5	5
Logic Voltage Range	Vdc	4.5-28	4.5-28
Max. Logic Supply Current @ Nominal Vcc	mA	6/CH	6/CH
Module ID Resistance to Logic Ground	Ω	0	0

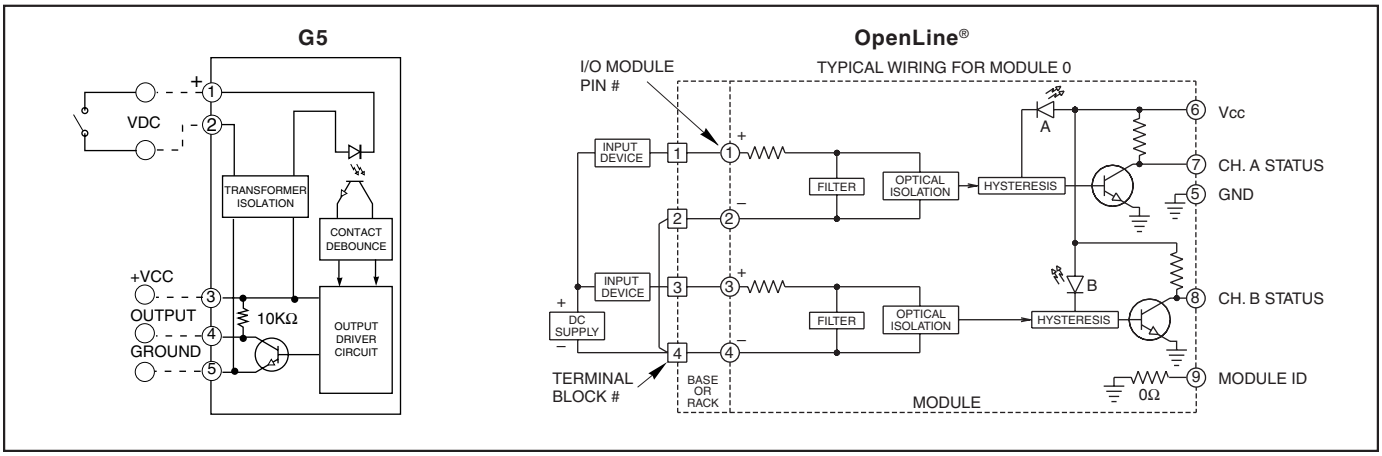
[1] For input voltages in the range of 90 to 140 Vdc, use AC input modules 70-IAC5, 70M-IAC5, 70G-IAC5 or 70L-IAC. For input voltages in the range of 180 to 280 Vdc, use AC input modules 70-IAC5A, 70M-IAC5A, 70G-IAC5A or 70L-IACA.

Available from your local Grayhill Distributor. For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

FEATURES

- Wire Dry Contact Sensors Directly to Module, Eliminate External Power Supply
- 2500 Vac Isolation
- Built-In Status LED
- UL, CSA, CE Mark, TÜV Certified (TÜV not available on OpenLine®)
- Simplifies Field Wiring

CIRCUITRY: Negative True Logic



SPECIFICATIONS:

Specifications apply over operating temperature range unless noted otherwise.

All Modules

Output Specifications

Output Current Range: 1-50 mA
Breakdown Voltage: 50 Vdc minimum
Off State Leakage Current: 1 µA maximum
On State Voltage Drop: 0.45 Vdc at 50 mA maximum

General Characteristics

Isolation Voltage Field to Logic: 2500 Vac (rms) minimum

OpenLine®

Vibration: .15mm, 10 to 50 Hz per IEC68-2-6
Mechanical Shock: 50 G's, 0.5 mS, sinsoidal per IEC68-2-27
Storage Temperature Range: -40°C to +100°C
Operating Temperature Range: -40°C to +85°C

G5

Vibration: 20 G's peak or .06" double amplitude 10–2000 Hz per MIL–STD–202, Method 204, Condition D
Mechanical Shock: 1500 G's 0.5 mS half-sine per MIL–STD–202, Method 213, Condition F
Storage Temperature Range: -40°C to +125°C
Operating Temperature Range: 0°C to +60°C

Available from your local Grayhill Distributor. For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number		
G5, Dry Contact		70L-IDC5S	70G-IDC5S	70G-IDC24S
Specifications	**Units**			
Maximum Dry Contact Voltage Rating	Vdc	25	25	25
Minimum Dry Contact Current Rating	mA	5	5	5
Maximum Turn-on Time	mSec	10	3.0	3.0
Maximum Turn-off Time	mSec	10	3.0	3.0
Contact Resistance (Output Low)	Ω	≤ 1.25K	≤1.25K	≤ 1.25K
Contact Resistance (Output High)	Ω	25K	25K	25K
Nominal Logic Voltage (Vcc)	Vdc	5	5	24
Logic Voltage Range: G5	Vdc	4.5-5.5	4.5-6	15-30
Max. Logic Supply Current @ Nominal Vcc	mA	120[1]	41	41

[1]WHEN BOTH CHANNELS ARE ACTIVATED

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ANALOG I/O MODULES

Analog output modules are used in proportional control of devices such as valves, motors, and heaters. Analog input modules are used in data gathering and proportional control applications.

All modules are potted for industrial environments. They operate under high vibration (IEC68-2-6; 0.15 mm/sec^2 at 10-150Hz) mechanical shock (IEC68-2-27; 11 mS, sinusoidal 30 gS) and high relative humidity (IEC68-2-3; 5-95% non-condensing). They feature a high level of noise immunity and accuracy. All models provide isolation from field to logic, field to power supply and module to module.

OpenLine® Analog

OpenLine® analog modules communicate serially with the controller. Each module has a separate transmit and receive line that operates at 115,200 baud with no parity bits, 8 data bits, and 1 stop bit (115.2K,N,8,1). The command structure and responses for all modules are detailed in Bulletin No. 743. Each module has a microcontroller and non-volatile serial EEPROM memory. The calibration data is stored within the EEPROM, and may be changed using the appropriate commands and the 70L-PROG field calibration unit. The software provided with the calibration unit communicates with the modules through the serial port of a PC. Calibration equipment is not provided.

OpenLine® Analog Input Modules

Upon request, analog input modules return a 12-bit value that is right justified and packed in a 16-bit word that represents the equivalent analog value sensed.

OpenLine® thermocouple inputs linearize the thermocouple reading and returns degrees to the controller.

Openline® Analog Output

For analog output modules, the output of these modules is zero scale on power up, then it is the analog equivalent of the 12-bit value sent to the module over the communication lines.

G5 Analog Output

The output (voltage or current level) of these modules varies proportionally to the 12-bit serial data string sent to them by a control circuit. The data string is typically 213.2 µSec. long as detailed in Figure 1. Once a data string is received, the output is set and remains constant until another data string is sent. Therefore, the output level of the module could be changed almost 4700 times a second.

For more information on programming Grayhill analog output modules, request a copy of Bulletin No. 581.

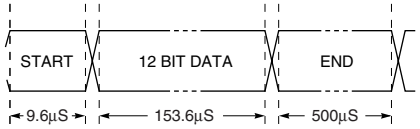


Figure 1

Start Pulse: High for 6.4 µS Min., then low for 3.2 µS
Data Packet: Each bit is 12.8 µS long.
High for first 3.2 µS of the bit.
Middle 6.4 µS determines the value of the data bit (High = 1, Low = 0).
Low for last 3.2 µS of the bit.
Stop Pulse: Low for 500 µS minimum
Times shown are ± 10%, except minimums.

SERIAL DATA FORMAT**

G5 Analog Input

G5 voltage or current input modules are actually frequency converters. The input to these modules is a signal from a sensor. The output from these modules is a squarewave whose frequency varies linearly from 14.4 to 72 KHz and is proportional to the input signal. The controller must be able to measure this frequency and convert it back to a signal level.

G5 thermocouple modules pass through the thermocouple reading and do not linearize the signal. Linearization must take place within the controller.

Agency Approvals

OpenLine® analog modules are EN50082-2 and EN50081-2 compliant and meet the requirements of 89/336/EEC EMC directive. They are also EN60950 (61010-1) compliant. Meeting these requirements allows the modules to bear the CE mark. Additionally, the modules are CSA certified to CSA 22.2 No. 14-95M and CSA 22.2 No. 213-M1987 Class I, Div. 2 Groups A, B, C and D and are UL recognized to UL 508.

PART NUMBER EXPLANATION: Analog I/O Modules

73G-IV50M

Module Type
73G = Analog Module, G5 Package, Single Channel
73L = Analog Module, OpenLine® Package, Dual Channel

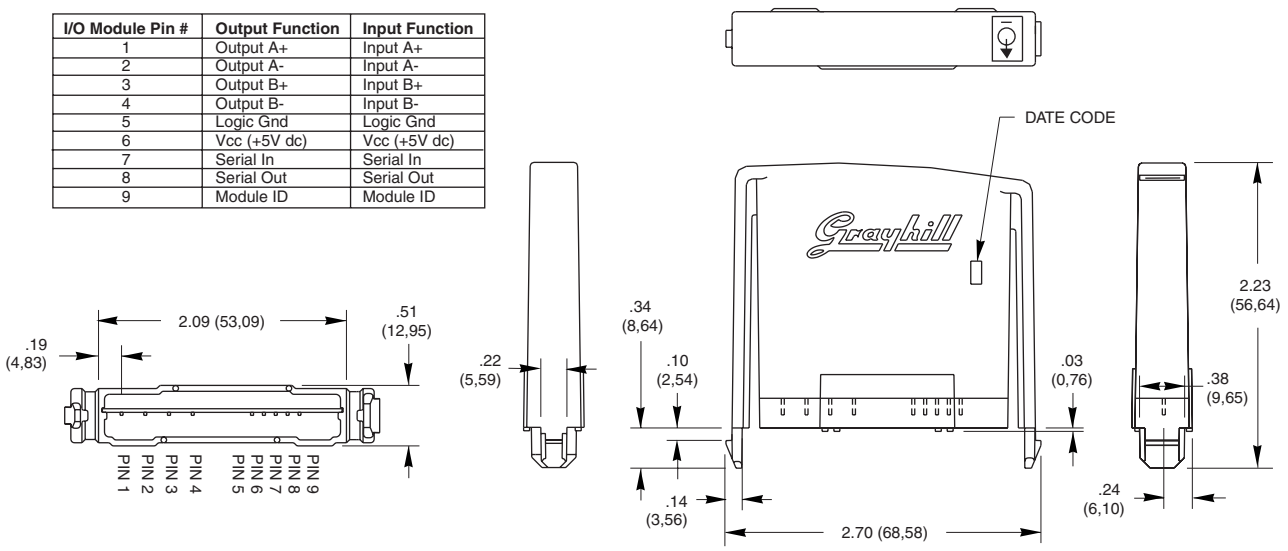
Function
OV = Analog Output, Voltage
OI = Analog Output, Current
IV = Analog Input, Voltage
II = Analog Input, Current
IT = Analog Input, Temperature

Suffix

Analog Modules:			
5 = 0–5 Vdc	10 = 0 - 10 Vdc	50M = 0–50 mV
5B = -5–5 Vdc	10B = -10 - 10 Vdc	100M = 0–100 mV
1 = 0–1 Vdc	020 = 0 to 20 mA	R100 = RTD
CJ = J type TC	420 = 4 to 20 mA	R3100 = 3 Wire RTD
CK = K type TC	5000 = 0 to 5 A	R4100 = 4 Wire RTD
CR = R type TC	AC120 = 28 to 140 Vac	
CT = T type TC	AC240 = 28 to 280 Vac	

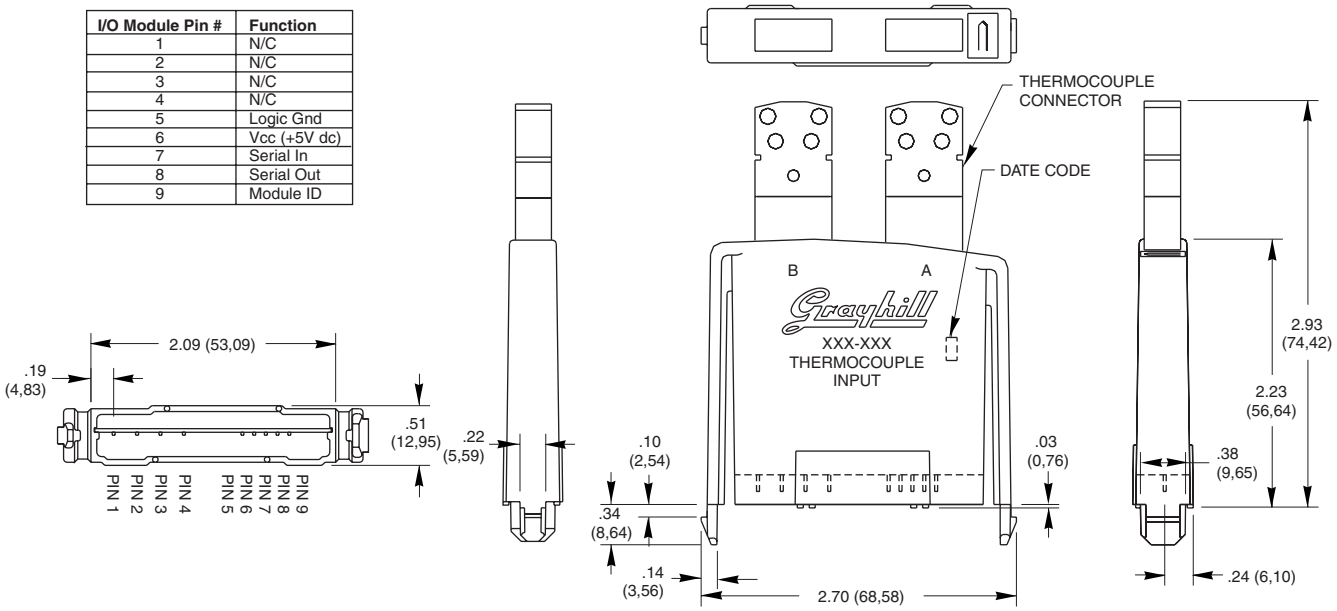
DIMENSIONS: OpenLine® Modules

I/O Module Pin #	Output Function	Input Function
1	Output A+	Input A+
2	Output A-	Input A-
3	Output B+	Input B+
4	Output B-	Input B-
5	Logic Gnd	Logic Gnd
6	Vcc (+5V dc)	Vcc (+5V dc)
7	Serial In	Serial In
8	Serial Out	Serial Out
9	Module ID	Module ID

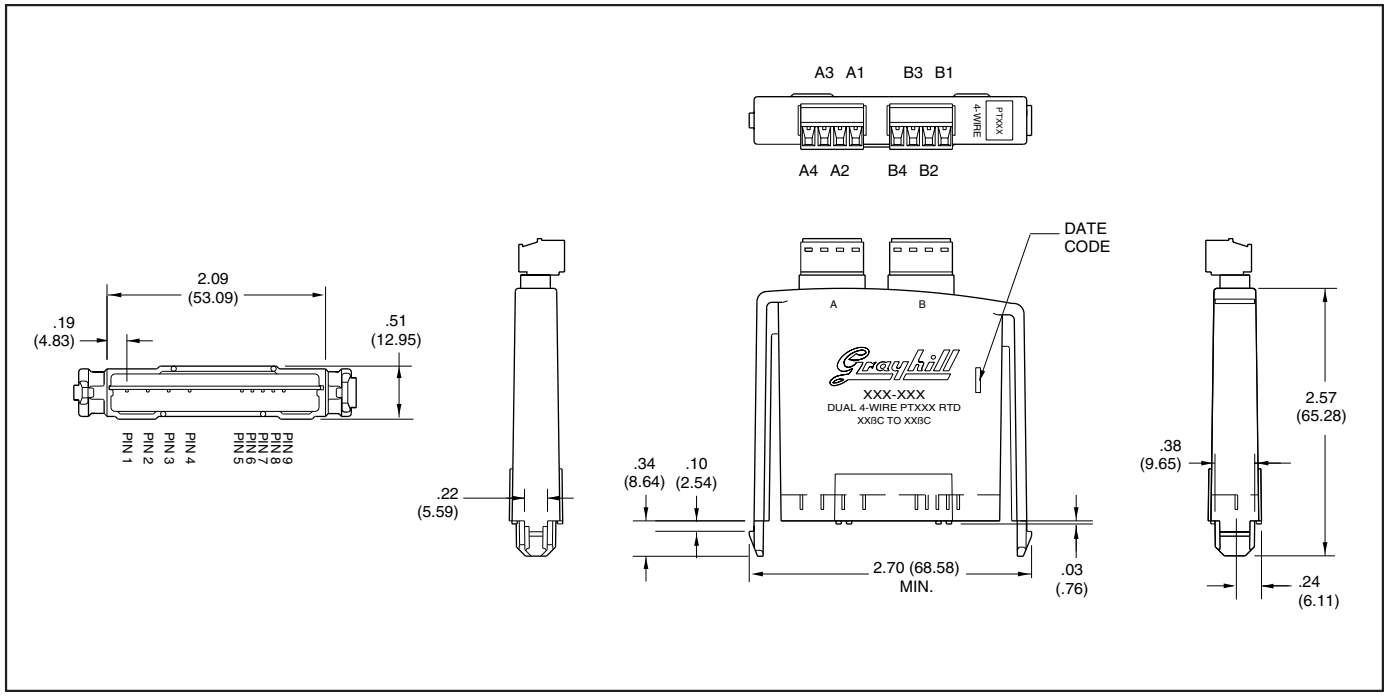


DIMENSIONS: OpenLine® Thermocouple Modules

I/O Module Pin #	Function
1	N/C
2	N/C
3	N/C
4	N/C
5	Logic Gnd
6	Vcc (+5V dc)
7	Serial In
8	Serial Out
9	Module ID

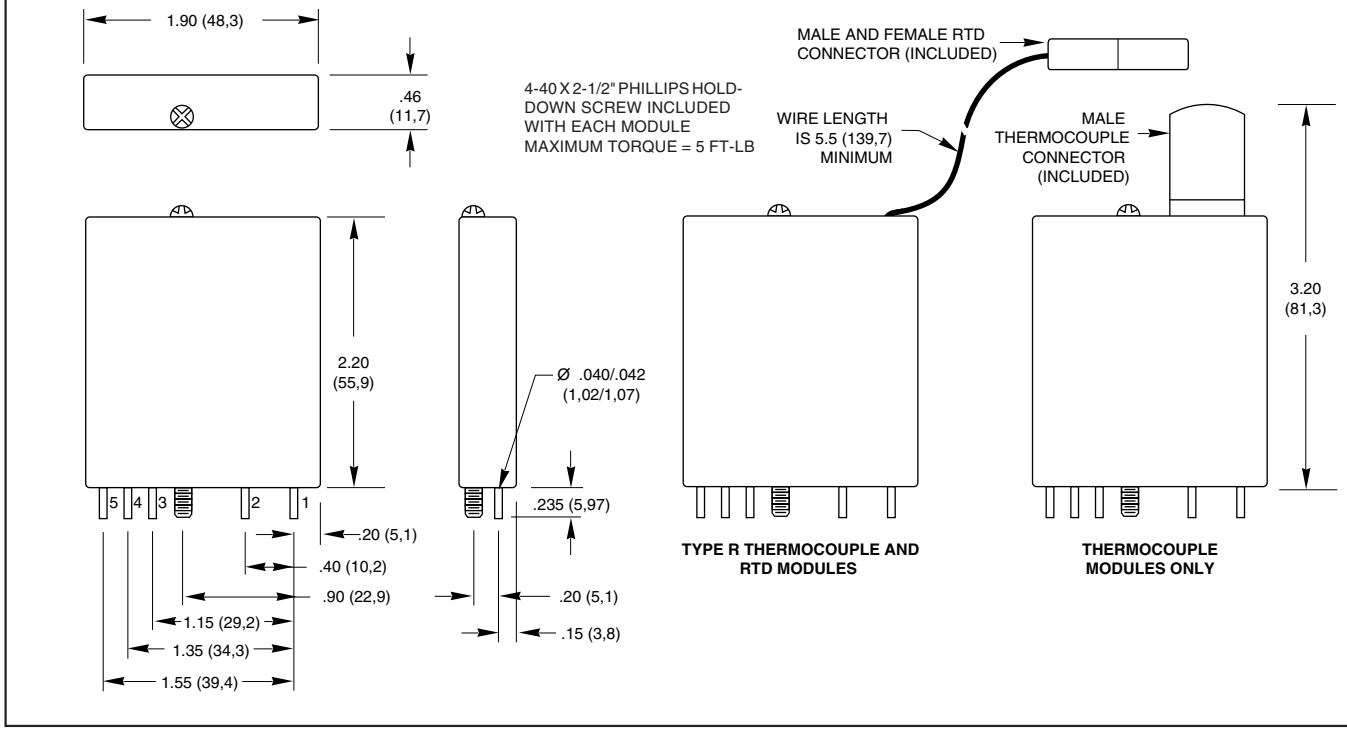


DIMENSIONS: OpenLine® 3-Wire and 4-Wire RTD Modules

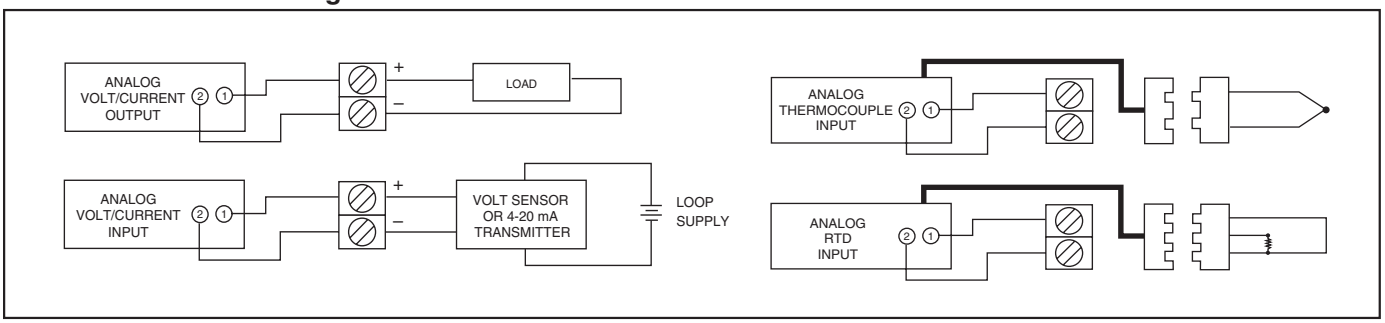


DIMENSIONS: G5 Analog Modules

Dimensions shown in inches (and millimeters).
Tolerances are ± .010 (0,25) unless indicated otherwise.



WIRING DIAGRAM: Analog I/O Modules



FUNCTION

(Check Specifications for Input and Output combinations, Feature or Option availability.)

Analog Output	**Supply Vcc** 5 Vdc -10 to 10 Vdc	**Voltage Range** 0 to 5 Vdc	**Current Range** 4 to 20 mA

Analog Input	**Supply Vcc** 5 Vdc	**Voltage Range** 50 or 100 mV 1, 5, or 10 Vdc -5 to +5 Vdc -10 to +10 Vdc 28 to 140 or 280 Vac **Current Range** 4-20 mA 0-5 A	**Temperature** J Type K Type R Type T Type RTD

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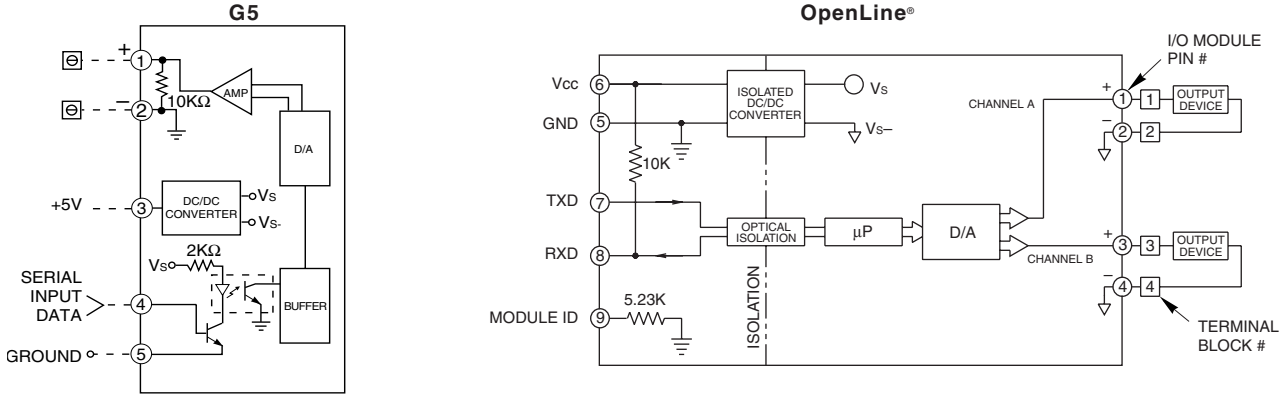
FEATURES

- Standard Package and Pin-out
- Single 5V Power Supply
- 12-Bit Resolution
- Optical Isolation
- Intermix With Digital Modules on the Same Rack
- Meets the Requirements of IEEE 472
- UL, CSA, CE Certified (OpenLine® only)

73L-OV 73G-OV

CIRCUITRY: Voltage Output

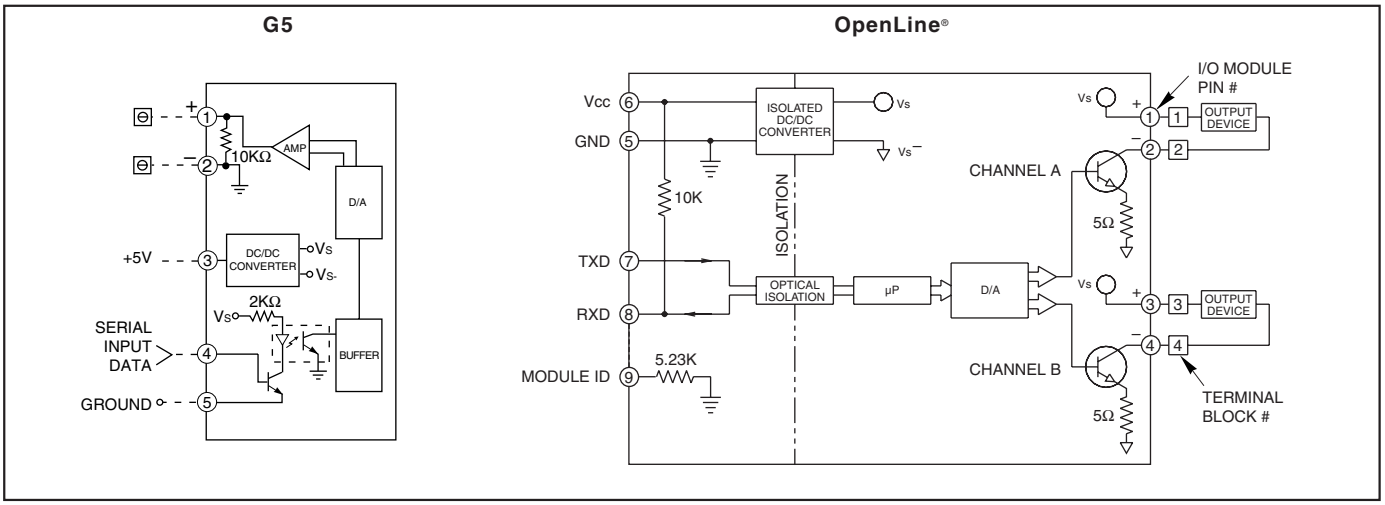


SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number			
G5, OpenLine®		73G-OV5, -OV5B	73G-OV10, -OV10B	73L-OV5, -OV5B	73L-OV10, -OV10B
Specifications	**Units**				
Number of Outputs		1 Ch., Diff.	1 Ch., Diff.	2 Ch., S.E.	2 Ch., S.E.
Resolution	bits	12	12	12	12
	mV/count	-OV5: 1.22 -OV5B: 2.44	-OV10: 2.44 -OV10B: 4.88	-OV5: 1.22 -OV5B: 2.44	-OV10: 2.44 -OV10B: 4.88
Absolute Accuracy @ 25°C[1, 2]		0.3% of full scale	0.3% of full scale	0.08% of full scale	0.06% of full scale
Accuracy Drift w/Temp.[2]					
Maximum Offset	PPM/°C	+/- 45	+/- 45	+/- 25	+/- 25
Maximum Gain (0 to 60°C)	PPM/°C	+/- 150	+/- 150	+/- 100	+/- 100
Serial Data Format		12-bit packet	12-bit packet	Left-justified, 16-bit	Left-justified, 16-bit
Serial Data Packet		—	—	115.2Kb, N, 8, 2	115.2Kb, N, 8, 2
Step Response Time	mS	0.5	0.5	0.8	0.8
Output Noise Ripple	mV rms	—	—	1.5 max.	3.7 max.
Output Voltage Range	Vdc	-OV5: 0-5 -OV5B: -5-5	-OV10: 0-10 -OV10B: -10-10	-OV5: 0-5 -OV5B: -5-5	-OV10: 0-10 -OV10B: -10-10
Maximum Load	Ω	250	1000	250	500
Logic Voltage Range	Vdc	4.5-5.5	4.5-5.5	4.75-5.25	4.75-5.25
Maximum Logic Supply Current @ 5Vdc	mA/Ch.	140	140	105	105
Power Up Status		Output @ min. value	Output @ min. value	Output @ min. value	Output @ min. value
Short Circuit Protection		Yes	Yes	Yes	Yes
Module ID (Pin 9)	KΩ	N/A	N/A	5.23	5.23
Isolation Voltage					
Field to Logic	Vrms	2500	2500	2500	2500
Field to Power	Vrms	2500	2500	2500	2500
Module to Module	Vrms	2500	2500	2500	2500
Channel A to Channel B		N/A	N/A	None	None
Environmental Conditions					
Operating Temperature	°C	0-60	0-60	-40-85	-40-85
Storage Temperature	°C	-25-85	-25-85	-40-100	-40-100

[1] Includes offset, gain, non-linearity and repeatability error terms.
[2] Accuracy and drift graphs are available in Bulletin #753.

CIRCUITRY: Current Output



SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number				
G5, OpenLine®		73G-OI420	73G-OI020	73L-OI420	73L-OI020	73L-OI024
Specifications	**Units**					
Number of Outputs		1 Ch., Diff.	1 Ch., Diff.	2 Ch., S.E.	2 Ch., S.E.	2 Ch., S.E.
Resolution	bits	12	12	12	12	12
	µA/count	3.9	4.9	3.9	4.9	5.9
Absolute Accuracy @ 25°C[1]						
Accuracy Drift w/Temp.[2]						
Maximum Offset	PPM/°C	+/- 45	+/- 45	+/- 50	+/- 50	+/- 50
Maximum Gain (0 to 60°C)	PPM/°C	+/- 150	+/- 150	+/- 100	+/- 75	+/- 100
Serial Data Format		12-bit packet	12-bit packet	Right Justified, 16-bit	Right Justified, 16-bit	Right Justified, 16-bit
Serial Data Packet		—	—	115.2Kb, N, 8, 2	115.2Kb, N, 8, 2	115.2Kb, N, 8, 2
Step Response Time	µS	0.5	0.5	500	500	500
Max. Loop Resistance[3]	Ohms	330	330	500	500	500
Output Current Range	mA	4-20	0-20	4-20	0-20	0-24
Maximum Load	Ω	250	1000	Continuous short circuit	Continuous short circuit	Continuous short circuit
Logic Voltage Range	Vdc	4.5-5.5	4.5-5.5	4.75-5.25	4.75-5.25	4.75-5.25
Maximum Logic Supply Current @ 5V dc	mA/Ch.	140	140	80	80	100
Power Up Status		Output @ min. value	Output @ min. value	Output @ min. value	Output @ min. value	Output @ min. value
Short Circuit Protection		Yes	Yes	Yes	Yes	Yes
Module ID (Pin 9)	KΩ	N/A	N/A	5.23	5.23	5.23
Isolation Voltage						
Field to Logic	Vrms	2500	2500	2500	2500	2500
Field to Power	Vrms	2500	2500	2500	2500	2500
Module to Module	Vrms	2500	2500	2500	2500	2500
Channel A to Channel B		N/A	N/A	None	None	None
Environmental Conditions						
Operating Temperature[3, 4]	°C	0-60	0-60	-40-85	-40-85	-40-85
Storage Temperature	°C	-25-55	-25-55	-40-100	-40-100	-40-100

[1] Includes offset, gain, non-linearity and repeatability error terms.
[2] Accuracy and drift graphs are available in Bulletin #753.
[3] External loop supply can increase maximum loop resistance rating.

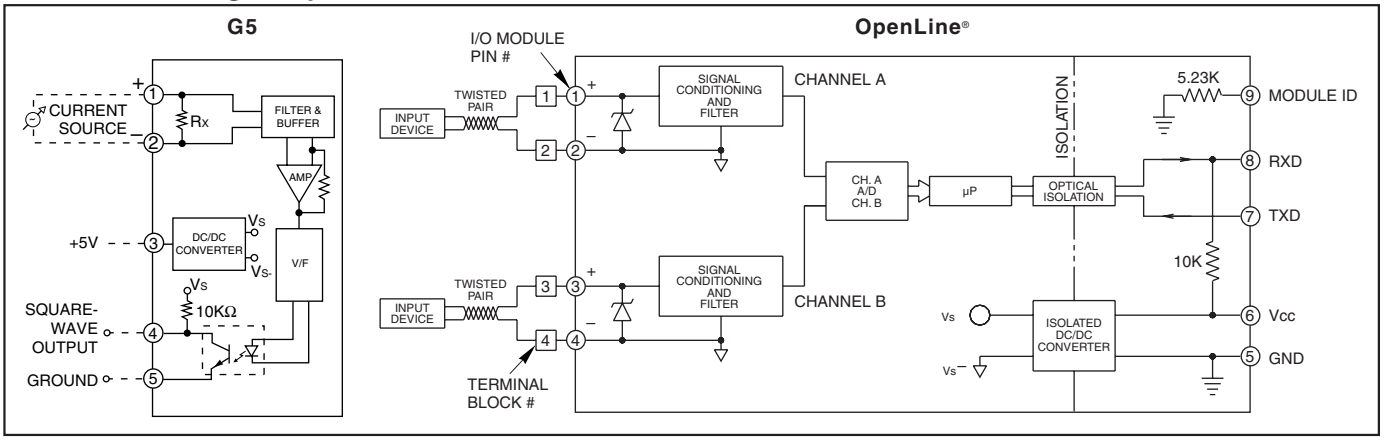
Available from your local Grayhill Distributor.
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

FEATURES

- Wide Variety of Input Ranges
- Standard Package and Pin-out
- Single 5V Power Supply
- 12-Bit Resolution
- Optical Isolation from Input to Output
- Intermix With Digital Modules on the Same Rack
- Meets the Requirements of IEEE 472
- UL, CSA, CE Certified (OpenLine only)

73L-IV 73G-IV

CIRCUITRY: Voltage Output



SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number					
G5, OpenLine®		73G-IV1	73G-IV5	73G-IV10	73L-IV1	73L-IV5	73L-IV10
Specifications	**Units**						
Number of Inputs		1 Ch., Diff.	1 Ch., Diff.	1 Ch., Diff.	2 Ch., S.E.	2 Ch., S.E.	2 Ch., S.E.
Resolution	bits	12	12	12	12	12	12
	µV/count	244.1	1221	2441	244.1	1221	2441
Absolute Accuracy@25°C[1, 2]	% of full scale	+/- 0.1	+/- 0.1	+/- 0.1	0.075	0.075	0.075
Accuracy Drift w/Temp.[2]							
Maximum Offset	PPM/°C	+/- 50	+/- 50	+/- 50	+/- 35	+/- 25	+/- 25
Maximum Gain (0-60°C)	PPM/°C	+/- 55	+/- 55	+/- 55	+/- 75	+/- 75	+/- 75
Serial Data Format		12-bit packet	12-bit packet	12-bit packet	Right Justified, 16-bit	Right Justified, 16-bit	Right Justified, 16-bit
Serial Data Packet		N/A	N/A	N/A	115.2Kb,N,8,2	115.2Kb,N,8,2	115.2Kb,N,8,2
Step Response Time[4]	mS	2.5	2.5	2.5	1.5	1.5	1.5
Input Resistance (Rx)	Mohm	1	1	1	2.2	2.2	2.2
Input Voltage Range	Vdc	0-1	0-5	0-10	0-1	0-5	0-10
Maximum Overload	V	—	—	—	+/- 30	+/- 30	+/- 30
Logic Voltage Range	Vdc	4.5-5.5	4.5-5.5	4.5-5.5	4.75-5.25	4.75-5.25	4.75-5.25
Maximum Logic Supply Current @ 5Vdc	mA/Ch.	150	150	150	38	38	38
Module ID (Pin 9)	KΩ	N/A	N/A	N/A	5.23	5.23	5.23
Isolation Voltage							
Field to Logic	Vrms	2500	2500	2500	2500	2500	2500
Field to Power	Vrms	2500	2500	2500	2500	2500	2500
Module to Module	Vrms	2500	2500	2500	2500	2500	2500
Channel A to Channel B		—	—	—	None	None	None
Environmental Conditions							
Operating Temperature[3]	°C	0 to 60	0 to 60	0 to 60	-40 to 85	-40 to 85	-40 to 85
Storage Temperature	°C	-25 to 85	-25 to 85	-25 to 85	-55 to 100	-55 to 100	-55 to 100

[1] Includes offset, gain, non-linearity and repeatability error terms.
[2] Accuracy and drift graphs are available in Bulletin #753.
[3] Start up temperature greater than -25°C.

SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number			
G5, OpenLine®		73G-IV5B	73G-IV10B	73L-IV5B	73L-IV10B
Specifications	**Units**				
Number of Inputs		1 Ch., Diff.	1 Ch., Diff.	2 Ch., S.E.	2 Ch., S.E.
Resolution	bits	12	12	12	12
	mV/count	2.44	4.88	2.44	4.88
Absolute Accuracy @ 25°C[1, 2]	% of full scale	+/-0.1	+/- 0.1	0.075	0.075
Accuracy Drift w/Temp.[2]					
Maximum Offset	PPM/°C	+/- 50	+/- 50	+/- 25	+/- 25
Maximum Gain (0 to 60°C)	PPM/°C	+/- 55	+/- 55	+/- 75	+/- 75
Serial Data Format		12-bit packet	12-bit packet	Right Justified, 16-bit	Right Justified, 16-bit
Serial Data Packet		—	—	115.2Kb, N, 8,2	115.2Kb, N, 8,2
Step Response Time[3]	mS	2.5	2.5	1.5	1.5
Input Resistance (Rx)	Mohm	1	1	2.2	2.2
Input Voltage Range	Vdc	-5 to 5	-10 to 10	-5 to 5	-10 to 10
Maximum Overload	V	—	—	+/- 30	+/- 30
Logic Voltage Range	Vdc	4.5-5.5	4.5-5.5	4.75-5.25	4.75-5.25
Maximum Logic Supply Current@5Vdc	mA/Ch.	150	150	38	38
Module ID (Pin 9)	KΩ	N/A	N/A	5.23	5.23
Isolation Voltage					
Field to Logic	Vrms	2500	2500	2500	2500
Field to Power	Vrms	2500	2500	2500	2500
Module to Module	Vrms	2500	2500	2500	2500
Channel A to Channel B		—	—	None	None
Environmental Conditions					
Operating Temperature	°C	0 to 60	0 to 60	-40 to 85	-40 to 85
Storage Temperature	°C	-25 to 55	-25 to 85	-55 to 100	-55 to 100

Type/Function		Grayhill Part Number			
G5, OpenLine®		73G-IV50M	73G-IV100M	73L-IV50M	73L-IV100M
Specifications	**Units**				
Number of Inputs		1 Ch., Diff.	1 Ch., Diff.	2 Ch., S.E.	2 Ch., S.E.
Resolution	bits	12	12	12	12
	µV/Count	12.2	24.4	12.2	24.4
Absolute Accuracy @ 25°C[1, 2]	% of full scale	+/- 0.1	+/- 0.1	0.07	0.07
Accuracy Drift w/Temp.[2]					
Maximum Offset	PPM/°C	+/- 50	+/- 50	+/- 35	+/- 35
Maximum Gain (0 to 60°C)	PPM/°C	+/- 55	+/- 55	+/- 75	+/- 75
Serial Data Format		12-bit packet	12-bit packet	Right Justified,16-bit	Right Justified,16-bit
Serial Data Packet		—	—	115.2Kb, N, 8, 2	115.2Kb, N, 8, 2
Step Response Time[3]	mS	2.5	2.5	1.5	1.5
Input Resistance (Rx)	Mohm	1	1	2.2	2.2
Input Voltage Range	mV	0-50	0-100	0-50	0-100
Maximum Overload	V	—	—	+/- 30	+/- 30
Logic Voltage Range	Vdc	4.5-5.5	4.5-5.5	4.75-5.25	4.75-5.25
Maximum Logic Supply Current@5Vdc	mA/Ch.	150	150	30	30
Module ID (Pin 9)	KΩ	N/A	N/A	5.23	5.23
Isolation Voltage					
Field to Logic	Vrms	2500	2500	2500	2500
Field to Power	Vrms	2500	2500	2500	2500
Module to Module	Vrms	2500	2500	2500	2500
Channel A to Channel B		N/A	N/A	None	None
Environmental Conditions					
Operating Temperature	°C	0 to 60	0 to 60	-40 to 85	-40 to 85
Storage Temperature	°C	-25 to 85	-25 to 85	-55 to 100	-55 to 100

[1] Includes offset, gain, non-linearity and repeatability error terms.
[2] Accuracy and drift graphs are available in Bulletin #753.
[3] Start up temperature greater than -25°C.

SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number	
G5		73G-IVAC120	73G-IVAC240
Specifications	**Units**		
Number of Inputs		1 Ch., Diff.	1 Ch., Diff.
Resolution	bits	12	12
	mV/Count	27.34	65.52
Absolute Accuracy @ 25°C[1]	% of full scale	+/- 0.3%	+/- 0.3%
Accuracy Drift w/Temp.			
Maximum Offset	PPM/°C	+/- 150	+/- 150
Maximum Gain (0 to 60°C)	PPM/°C	+/- 150	+/- 150
Serial Data Format		12-bit packet	12-bit packet
Step Response Time[2]	mS	2.5	2.5
Input Resistance	Mohm	1	1
Input Voltage Range	Vac	28 to 140	28 to 280
Logic Voltage Range	Vdc	4.5-5.5	4.5-5.5
Maximum Logic Supply Current @ 5V dc	mA/Ch.	150	150
Isolation Voltage			
Field to Logic	Vrms	2500	2500
Field to Power	Vrms	2500	2500
Module to Module	Vrms	2500	2500
Environmental Conditions			
Operating Temperature[3]	°C	0 to 60	0 to 60
Storage Temperature	°C	-25 to 85	-25 to 85

[1] Includes offset, gain, non-linearity and repeatability error terms.
[2] Time required for output frequency to change to within 1% of final reading.

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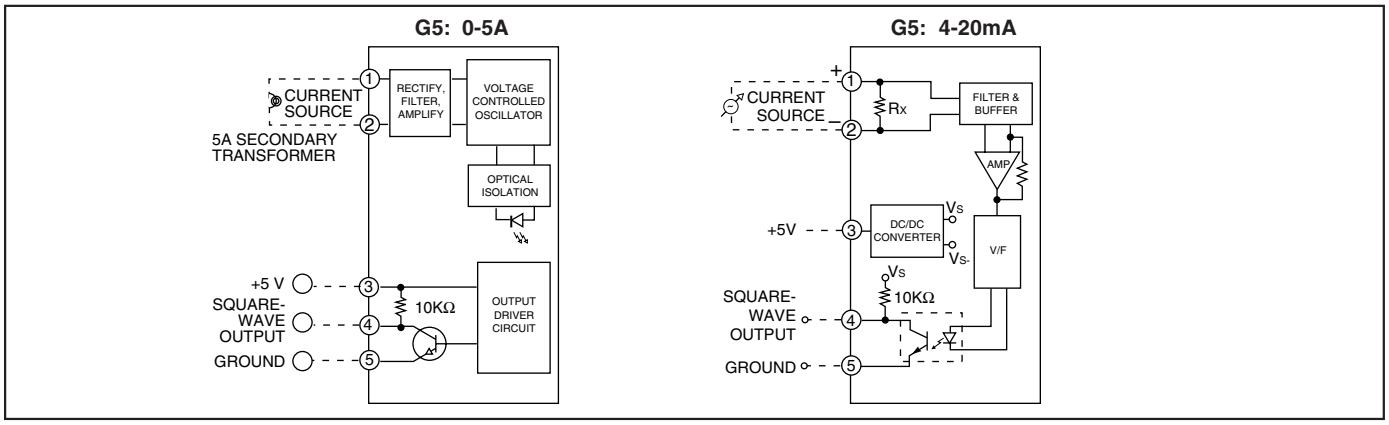
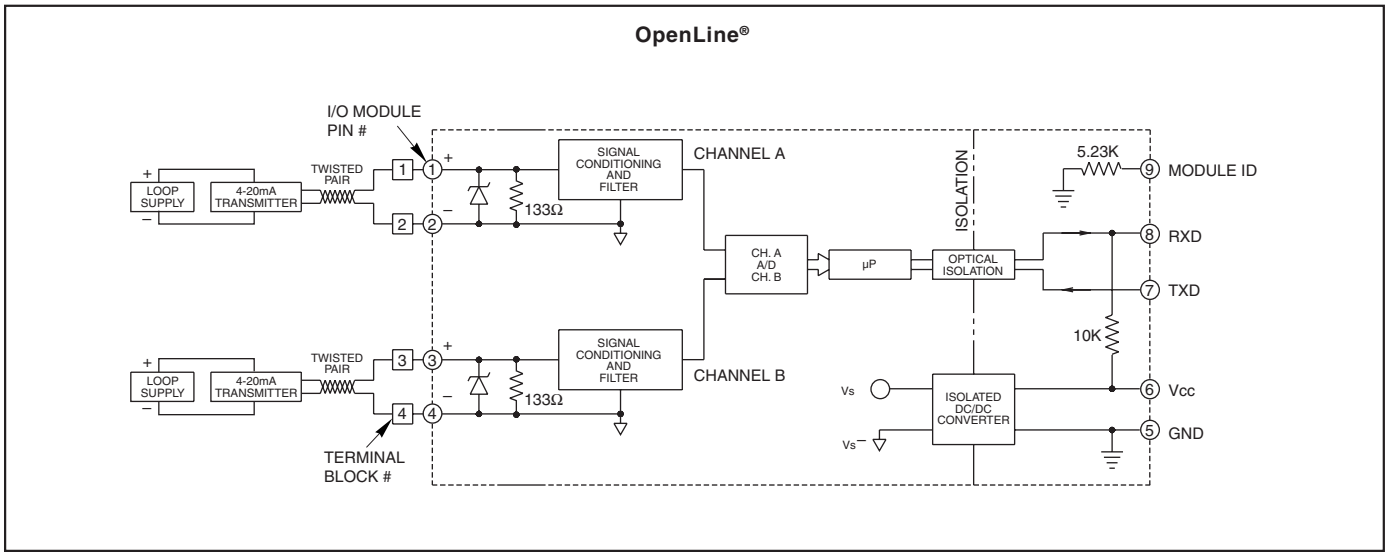
FEATURES

- Wide Variety of Input Ranges
- Standard Package and Pin-out
- Single 5V Power Supply
- 12-Bit Resolution
- Optical Isolation from Input to Output
- Intermix With Digital Modules on the Same Rack
- Meets the Requirements of IEEE 472
- UL, CSA, CE Certified (OpenLine only)

73L-II 73G-II

CIRCUITRY: Voltage Output





I/O Modules

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SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number					
G5, OpenLine®		73G-II020	73G-II420	73G-II5000	73L-II020	73L-II420	73L-II222
Specifications	**Units**						
Number of Inputs		1 Ch., Diff.	1 Ch., Diff.	1 Ch., Diff.	2 Ch., S.E.	2 Ch., S.E.	2 Ch., S.E.
Resolution	bits	12	12	12	12	12	12
	µA/Count	4.88	3.91	1221	4.88	3.91	4.88
Absolute Accuracy @ 25°C[1, 2]	% of full scale	+/- 0.2	+/- 0.2	+/- 0.3	0.075	0.075	0.075
Accuracy Drift w/Temp.[2]							
Maximum Offset	PPM/°C	+/- 50	+/- 50	+/- 150	+/- 25	+/- 25	+/- 25
Maximum Gain (0 to 60°C)	PPM/°C	+/- 55	+/- 55	+/- 150	+/- 75	+/- 75	+/- 75
Serial Data Format		12-bit packet	12-bit packet	12-bit packet	Right Justified, 16-bit	Right Justified, 16-bit	Right Justified, 16-bit
Serial Data Packet		—	—	—	115.2Kb, N, 8, 2	115.2Kb, N, 8,2	115.2Kb, N, 8,2
Step Response Time[3]	mS	2.5	2.5	2.5	1.5	1.5	1.5
Input Resistance (Rx)	ohms	133 +/- 1%	133 +/- 1%	.020 +/-.02%	133/- 1%	133 +/- 1%	133 +/- 1%
Input Current Range	mA or A	0-20mA	4-20mA	0-5A TRMS	0-20mA	4-20mA	2-22mA
Maximum Overload	V	—	—	—	6	6	6
Logic Voltage Range	Vdc	4.5-5.5	4.5-5.5	4.5-5.5	4.75-5.25	4.75-5.25	4.75-5.25
Maximum Logic Supply Current@5Vdc	mA/Ch.	150	120	160	38	38	38
Module ID (Pin 9)	KΩ	N/A	N/A	N/A	5.23	5.23	5.23
Isolation Voltage							
Field to Logic	Vrms	2500	2500	2500	2500	2500	2500
Field to Power	Vrms	2500	2500	2500	2500	2500	2500
Module to Module	Vrms	2500	2500	2500	2500	2500	2500
Channel A to Channel B		—	—	—	None	None	None
Environmental Conditions							
Operating Temperature[3]	°C	0 to 60	0 to 60	0 to 60	-40 to 85	-40 to 85	-40 to 85
Storage Temperature	°C	-25 to 85	-25 to 85	-25 to 85	-55 to 100	-55 to 100	-55 to 100

[1] Includes offset, gain, non-linearity and repeatability error terms.
[2] Accuracy and drift graphs are available in Bulletin #753.
[3] Time required for output to change to within 1% of final value.

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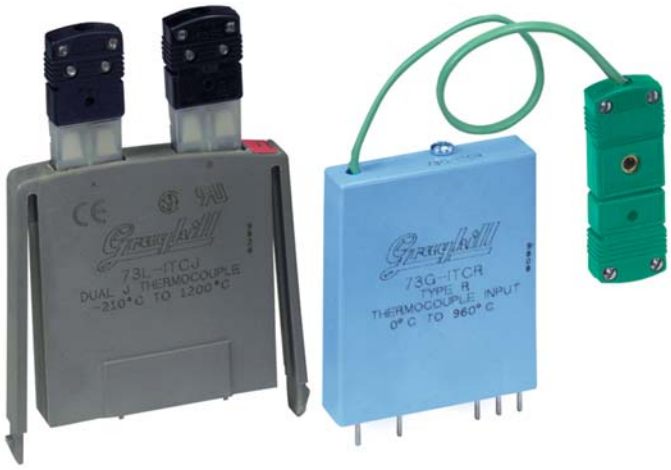
FEATURES

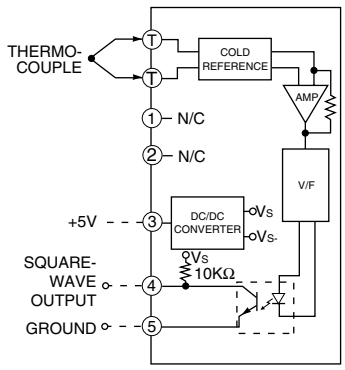
- Wide Variety of Input Types
- Standard Package and Pin-out
- Single 5V Power Supply
- 12-Bit Resolution
- Optical Isolation from Input to Output
- Cold Junction Temperature Compensated Connector Included
- Intermix With G5 Digital Modules on the Same Rack
- Meets the Requirements of IEEE 472
- UL, CSA, CE Certified (OpenLine only)



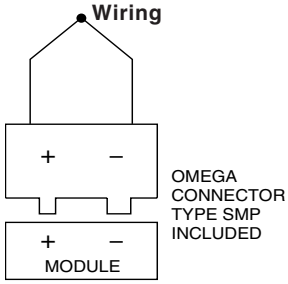
73L-IT 73G-IT

CIRCUITRY

G5

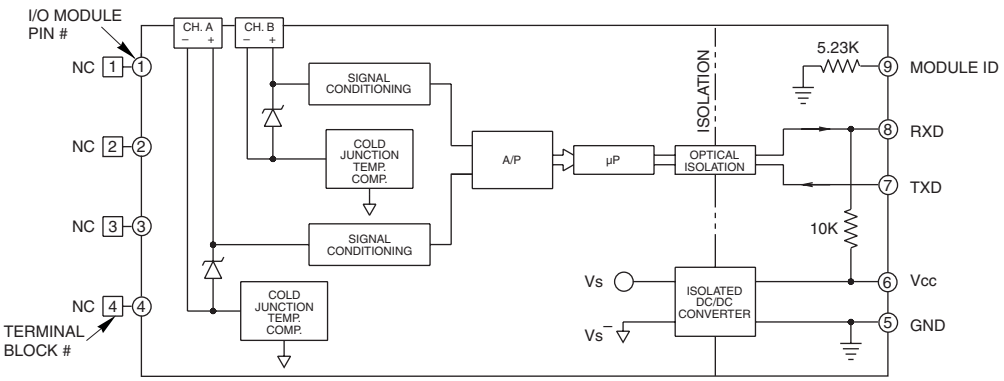


G5: Connector Wiring

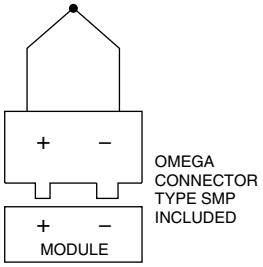


Thermocouple Wire Colors		
Type	+	–
J	White	Red
K	Yellow	Red
T	Blue	Red
R	Black	Red

OpenLine®



OpenLine®: Connector Wiring



Thermocouple Wire Colors		
Type	+	–
J	White	Red
K	Yellow	Red
T	Blue	Red
R	Black	Red

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SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number			
G5		73G-ITCJ	73G-ITCK	73G-ITCR	73G-ITCT
Specifications	**Units**				
Number of Inputs		1 Ch.	1 Ch.	1 Ch.	1 Ch.
Resolution	bits	12	12	12	12
	°C/count	0.18	0.25	0.23	0.10
Absolute Accuracy @ 25°C[1, 2]	°C	+/- 3.0	+/- 3.0	+/- 3.0	+/- 3.0
Accuracy Drift w/Temp.[2]					
Maximum Offset	PPM/°C	+/- 100	+/- 100	+/- 100	+/- 100
Maximum Gain (0 to 60°C)	PPM/°C	+/- 55	+/- 55	+/- 55	+/- 55
Serial Data Format		12-bit packet	12-bit packet	12-bit packet	12-bit packet
Serial Data Packet		—	—	—	—
Step Response Time[3]	mS	2.5	2.5	2.5	2.5
Input Temperature Range	°C (°F)	0 to 700 (32-1292)	-100 to 924 (-148-1695)	0 to 960 (32-1760)	-200 to 224 (-328-435)
Maximum Overload	V	—	—	—	—
Logic Voltage Range	Vdc	4.5 to 5.5	4.5 to 5.5	4.5 to 5.5	4.5-5.5
Maximum Logic Supply Current @ 5V dc	mA/Ch.	150	150	150	150
Module ID (Pin 9)	KΩ	—	—	—	—
Isolation Voltage					
Field to Logic	Vrms	2500	2500	2500	2500
Field to Power	Vrms	2500	2500	2500	2500
Module to Module	Vrms	2500	2500	2500	2500
Channel A to Channel B		—	—	—	—
Environmental Conditions					
Operating Temperature[3]	°C	0 to 60	0 to 60	0 to 60	0-60
Storage Temperature	°C	-25 to 85	-25 to 85	-25 to 85	-25-85

Type/Function		Grayhill Part Number		
OpenLine®		73L-ITCJ	73L-ITCK	73L-ITCT
Specifications	**Units**			
Number of Inputs		2 Ch.	2 Ch.	2 Ch.
Resolution	bits	12	12	12
	°C/count	0.34	0.36	0.16
Absolute Accuracy @ 25°C[1, 2]	°C	+/- 1.0	+/- 1.0	+/- 0.4
Accuracy Drift w/Temp.[2]				
Maximum Offset	PPM/°C	+/- 50	+/- 50	+/- 50
Maximum Gain (0 to 60°C)	PPM/°C	+/- 100	+/- 100	+/- 100
Serial Data Format		Right Justified,16-bit	Right Justified,16-bit	Right Justified,16-bit
Serial Data Packet		115.2 Kb, N, 8, 2	115.2 Kb, N, 8, 2	115.2 Kb, N, 8, 2
Step Response Time[3]	mS	100	100	100
Input Temperature Range	°C (°F)	-210 to 1200 (-346 to 2192)	-100 to 1372 (-148 to 2502)	-240 to 400 (-400 to 752)
Maximum Overload	V	+/- 6	+/- 6	+/- 6
Logic Voltage Range	Vdc	4.75 to 5.25	4.75 to 5.25	4.75 to 5.25
Maximum Logic Supply Current @ 5V dc	mA/Ch.	38	38	38
Module ID (Pin 9)	KΩ	5.23	5.23	5.23
Isolation Voltage				
Field to Logic	Vrms	2500	2500	2500
Field to Power	Vrms	2500	2500	2500
Module to Module	Vrms	2500	2500	2500
Channel A to Channel B		None	None	None
Environmental Conditions				
Operating Temperature[3]	°C	-40 to 85	-40 to 85	-40 to 85
Storage Temperature	°C	-55 to 100	-55 to 100	-55 to 100

[1] Includes offset, gain, non-linearity and repeatability error terms.
[2] Accuracy and drift graphs are available in Bulletin #753.
[3] Time required for output to change within 1% of final reading.

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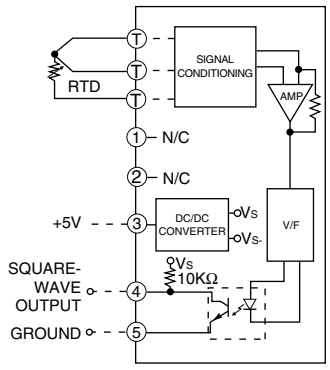
FEATURES

- Standard Package and Pin-out
- Single 5V Power Supply
- 12-Bit Resolution
- Optical Isolation from Input to Output
- Intermix With Digital Modules on the Same Rack
- Meets the Requirements of IEEE 472
- UL, CSA, CE Certified (OpenLine only)
- OpenLine® has 2-wire, 3-wire and 4-wire versions

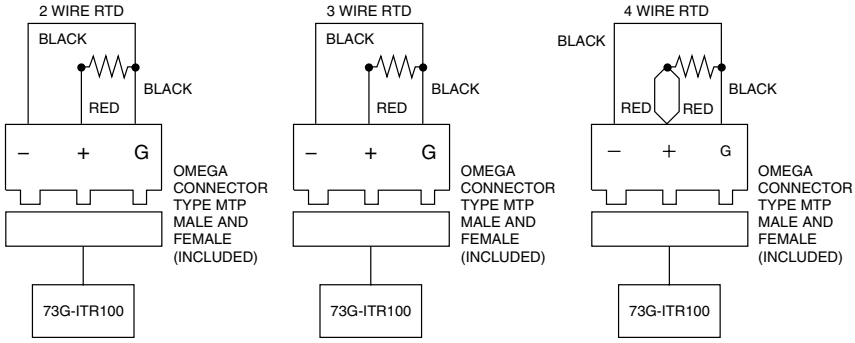
73L-ITR3100 (4100) 73L-ITR100 73G-ITR

CIRCUITRY

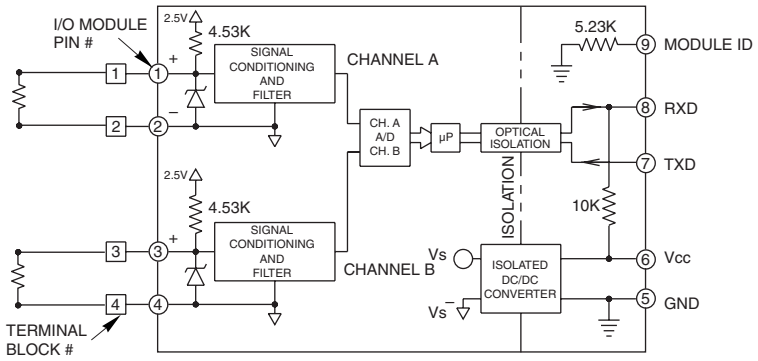
G5



G5: Connector Wiring



OpenLine®: 2 Wire RTD



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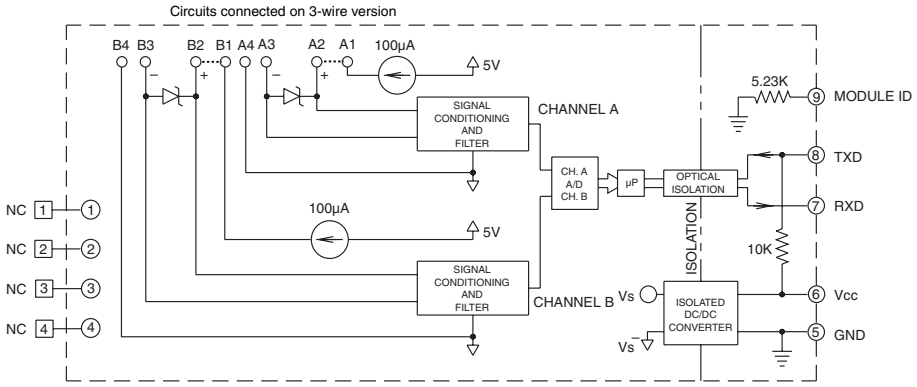
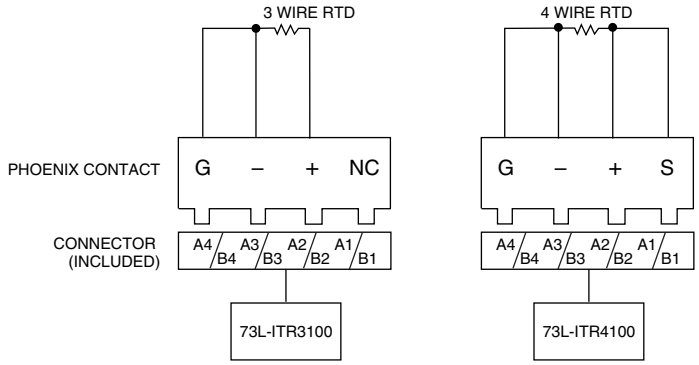
CIRCUITRY

OpenLine®: 3 or 4 Wire RTD



OpenLine®: Connector Wiring



SPECIFICATIONS: By Part Number

Type/Function		Grayhill Part Number		
G5, OpenLine®		**73G-ITR100**	**73L-ITR100**	**73L-ITR3100/73L-ITR4100**
Specifications	**Units**			
Number of Inputs		1 Ch.	2 Ch.	2 Ch.
Resolution	bits	12	12	12
	°C/count	0.10	0.098	0.098
Absolute Accuracy @ 25°C[1, 2]		+/- 0.8	+/- 0.3	+/- 0.3
Full Range Deflection		DIN 43760 standard	DIN 43760 standard	DIN 43760 standard
Temperature Coefficient		0.00385 (European)	0.00385 (European)	0.00385 (European)
Serial Data Format		12-bit packet	Right Justified, 16-bit	Right Justified, 16-bit
Serial Data Packet		—	115.2Kb, N, 8, 2	115.2Kb, N, 8, 2
Step Response Time[3]	mS	2.5	42	42
Input Temperature Range	°C (°F)	-50-350 (-58-662)	-50-350 (-58-662)	-50-350 (-58-662)
RTD Type		100 ohm platinum	100 ohm platinum	100 ohm platinum
Maximum Overload	V	—	+/- 6	+/- 6
Logic Voltage Range	Vdc	4.5-5.5	4.75-5.25	4.75-5.25
Max. Logic Supply Current@5Vdc	mA/Ch.	150	38	38
Module ID (Pin 9)	KΩ	N/A	5.23	5.23
Isolation Voltage				
Field to Logic	Vrms	2500	2500	2500
Field to Power	Vrms	2500	2500	2500
Module to Module	Vrms	2500	2500	2500
Channel A to Channel B		—	None	None
Environmental Conditions				
Operating Temperature	°C	0 to +60°C	-40 to +85°C	-40 to +85°C
Storage Temperature	°C	-40 to +85°C	-55 to -100°C	-55 to +100°C

[1] Includes offset, gain, non-linearity and repeatability error terms.
[2] Accuracy and drift graphs are available in Bulletin #753.
[3] Time required for output to change to within 1% of final reading.

Available from your local Grayhill Distributor.
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